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MAMMALS COLLECTED IN CENTRAL AFRICA BY CAPTAIN E. ARRHENIUS

BY

EINAR LÖNNBERG.

WITH 12 PLATES AND 11 FIGURES IN THE TEXT

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During a long sojourn in the easternmost parts of Belgian Congo Captain ELIAS ARRHENIUS has collected the extremely valuable material of mammals on which this memoir is based, and at his return home he most generously presented the same to the R. Swedish Natural History Museum. For this magnificent gift I beg to publicly express my great gratitude on behalf of the Museum.

The localities at which Captain ARRHENIUS has collected this material are the following:

Rutshuru: the station itself is situated a little to the east (perhaps about 12 km. to judge from a map) of Rutshuru River, about half way between Lake Albert Edward and Lake Kivu. There are partly open plains, but also forests on mountains. Such a mountain forest, in which Chimpanzees were collected, is situated about 5 hours march from Rutshuru station. Another forest is mentioned in the diary with the following words: »la Shasha-rivière — petit forêt». *Colobus occidentalis* was found there. Another forest, in which Duikers, Baboons and Leopards were obtained, is mentioned as »montagne et forêt Kabwe».

Kasindi near the northern end of Lake Albert Edward.

Beni: the station is situated about 60 km. north of the shore of Lake Albert Edward and surrounded by the great forest. Very many forest animals of different kinds were collected here, some of them at a distance of a couple of days march to the west of Beni.

The volcano Mikeno among the Virunga mountains about 30 km. north east from Kissenji which is situated at the northeastern shore of Lake Kivu. In the bamboo-forest of Mikeno Gorillas were collected.

Masisi: a station situated not far from Lake Kivu. At this place many forest-animals as Monkeys, Squirrels, Duikers etc. were collected.

All these localities are situated in the Central African Lake District, or on the frontier to the great West African Forest-region. In consequence of this it must be expected from a zoogeographical point of view that the greatest number of the mammals from these localities ought to belong to the West African fauna, or at least to be so to say of western type and have their nearest relatives in West-Africa. This is also the case. There are, however, as can be seen from the list below, also certain mammals representing species which are pretty evenly distributed over the greater part of the African continent, even if they have developed a greater or less number of subspecies. The presence of such mammals in a district does not give the fauna any certain zoogeographical stamp in the

same degree as some others. If they are represented by endemic subspecies they indicate, however, that the fauna has in consequence of certain natural conditions developed independently from that of neighbouring districts. The Central African Lake district has proved with regard to its bird life to form to some extent a zoogeographical province, although it has much in common with other parts of Africa. Although the present collection is not so complete that it can be regarded as fully representative — the small mammals are to great extent lacking — it gives, however, much good information about the composed nature of the mammalian fauna of these parts of Africa and also about the presence of many endemic forms, which partly have been described before, partly now are introduced into the scientific literature. These facts indicate that the district in question also with regard to its mammals, as well as with regard to its birds, forms a zoogeographical province.

The mammals of the present collection which show more affinities with the fauna of the great East-South-African subregion have mostly been collected at Rutshuru which, of course, depends upon the fact that the natural conditions there exhibit some likeness to those of East Africa with partly open plains and less thick forests. The Tumbili-monkey (*Cercopithecus pygerythrus centralis*) and the Baboon (*Papio tessellatus*) are good examples of such East African types, although as subspecies both appear to be endemic in the Lake district.

Characteristic animals for a more or less open country are also Lion, Serval, Cat (*Felis ocreata*), Jackal (*Canis adustus*), Warthog, Cape Buffalo (*B. caffer radcliffei*), Korrigum (*D. korrigum ugandæ*), Bushduiker (*Sylvicapra grimmia lutea*) etc. which also partly have developed endemic races in this district.

A direct affinity with the South African fauna is presented by *Poecilogale albinocha doggetti*, but even in this case an endemic subspecies is met with.

The forest animals are mostly of western type, although some genera like *Colobus* and *Cercocebus* extend right across the tropical parts of the continent from west to east.

Many of these western animals are at, or near their eastern frontier in this district as for instance the Gorilla, the Chimpanzee, several forest Duikers etc.

A *Perodictius* has also been found some years ago on Mt. Elgon, but otherwise the new species of this genus described below appears to be the most eastern representative of this genus.

The find of an *Idiurus* in the Kivu district is also very remarkable as this genus formerly was known from Cameroon. This eastern *Idiurus* is not, however, quite identical with the formerly described species. In this respect analogies are also found among other forest animals f. i. among the Duikers which often to some degree differ from their westernmost relatives. It is also interesting to find that sometimes it is difficult or impossible to see any difference between mammals from the forests at Beni and Rutshuru and even at Masisi, but in other cases there has been developed separate races at one or both of the latter localities.

List of mammals collected by Captain E. Arrhenius.

<i>Gorilla beringei mikenensis</i> n. subsp.	Mikeno
<i>Anthropopithecus</i> cf. <i>cottoni</i> MATSCHIE	Rutshuru
<i>Colobus occidentalis</i> ROCHEBRUNE	Rutshuru, Beni
» <i>elliotti</i> DOLLMAN	Beni
<i>Cercopithecus schmidti enkamer</i> MATSCHIE	Beni, Rutshuru & Masisi
» <i>pygerythrus centralis</i> NEUMANN	Rutshuru
» <i>leucampyx schubotzi</i> MATSCHIE	Beni, Rutshuru
» <i>kandti</i> MATSCHIE	Kisenji
<i>Cercocebus albigena ituricus</i> MATSCHIE	Beni, Rutshuru
<i>Papio tessellatus</i> ELLIOT	Rutshuru
<i>Perodictius arrhenii</i> n. sp.	Masisi
<i>Hemigalago demidoffi medius</i> THOMAS	»
<i>Rousettus leachi</i> A. SMITH	»
<i>Hypsignathus monstrosus</i> H. ALLEN	?
<i>Micropterus pusillus</i> PETERS	?
<i>Potamogale velox argens</i> THOMAS	Masisi
<i>Felis leo bleyenberghi</i> LÖNNBERG	Kabare, Rutshuru, Beni
» <i>pardus centralis</i> n. subsp.	Rutshuru (& Kabare)
» <i>ocreata</i> GMELIN	Rutshuru
» <i>serval</i> ERXLEBEN	»
<i>Civettictis civetta</i> SCHREBER	Masisi
<i>Genetta servalina intensa</i> n. subsp.	Masisi & Beni
» <i>stuhmanni</i> MATSCHIE	Masisi, Rutshuru
<i>Nandinia binotata</i> GRAY	Masisi
<i>Mungos ichneumon centralis</i> n. subsp.	Beni
» <i>paludinosus</i> cf. <i>rubescens</i> HOLLISTER	Rutshuru
<i>Crossarchus zebroides</i> LÖNNBERG	Kasindi
<i>Poecilogale albinucha doggetti</i> THOMAS & SCHWANN	Rutshuru
<i>Canis adustus</i> SUNDEVALL	?
<i>Anomalurus jacksoni fortior</i> n. subsp.	Masisi, Beni
» <i>pusillus</i> THOMAS	Masisi
<i>Idiurus zenkeri kiruensis</i> n. subsp.	»
<i>Aethosciurus ruwenzorii vulcanicus</i> THOMAS	»
<i>Heliosciurus rufobrachiatu semlikii</i> THOMAS	Beni
» » <i>arrhenii</i> n. subsp.	Masisi
» » <i>pascha</i> SCHWANN	Rutshuru
<i>Protoxerus stangeri centricola</i> THOMAS	Beni, Masisi
<i>Paraxerus böhmi emini</i> MATSCHIE	Beni
» <i>alexandri</i> THOMAS & WROUGHTON	»
<i>Funisciurus carruthersi</i> THOMAS & WROUGHTON	Masisi
» <i>akka</i> DE WINTON	»

<i>Graphiurus soleatus</i> THOMAS & WROUGHTON	Masisi
<i>Oenomys bachante unyori</i> THOMAS	»
<i>Cricetomys gambianus emini</i> WROUGHTON	»
» » <i>kivuensis</i> n. subsp.	»
» » <i>proparator</i> WROUGHTON	Beni
» sp.	Masisi
» <i>microtis</i> n. sp.	»
<i>Thryonomys rutshuricus</i> n. sp.	Rutshuru
<i>Dendrohyrax dorsalis</i> FRASER	Beni
<i>Elephas africanus cottoni</i> LYDEKKER	Rutshuru
<i>Buffelus caffer radcliffei</i> THOMAS	»
<i>Damaliscus korrigum ugandæ</i> BLAINE	»
<i>Cephalophus weynsi</i> THOMAS	Beni
» » <i>rutshuricus</i> n. sp.	Rutshuru
» ? <i>johnstoni</i> THOMAS	Beni
» <i>claudi mixtus</i> n. subsp.	»
» <i>lencogaster</i> GRAY	»
» <i>castaneus arrhenii</i> n. subsp.	»
» <i>melanorheus æquatorialis</i> MATSCHIE	»
<i>Sylvicapra grimmia lutea</i> DOLLMAN	»
<i>Hylarnus harrisoni</i> THOMAS	Beni, Masisi
<i>Kobus defassa forma diane</i> MATSCHIE	Rutshuru
<i>Adenota kob thomasi</i> SCLATER	»
<i>Redunca arrundinum</i> BODDAERT	?
» <i>redunca wardi</i> THOMAS	Rutshuru
<i>Tragelaphus diane forma sassæ</i> MATSCHIE	»
<i>Okapia johnstoni</i> SCLATER	Beni
<i>Phacochærus africanus centralis</i> n. subsp.	Lake Albert Edward
<i>Potamochoerus intermedius arrhenii</i> n. subsp.	
<i>Manis tetradactyla</i> LIN.	Beni
» <i>tricuspis</i> RAFINESQUE	?

The collection contains as this list shows more than 70 different kinds of mammals. Out of this number not less than 16 appear to differ so much from their nearest relatives known from other localities that I have been obliged to distinguish them with new names. This is a further proof of the well known fact that the mammalian fauna of Africa is extremely rich, and that it has developed a remarkably great number of local, or geographical races. Although thus the mammals of a certain genus inhabiting a certain locality often very plainly differ from the corresponding ones of another locality, they do not, however, as a rule differ much inter se, nor vary very much at one and the same locality. Capt. ARRHENIUS has, however, by this very valuable collection in several instances brought to light a remarkably great individual variation among certain mammals, which is the better apparent, because he has been fortunate enough to obtain good series of

specimens, without which it would have been impossible to form any definite opinion in such a difficult matter. In some instances a similar variation has been reported upon before. For instance, LORENZ VON LIBURNAU has written about the colour variation among the red *Colobus*-monkeys which he has named *C. variabilis*, and which variation also is to be seen in this collection. It is also well known to every mammalogist, who has worked with African mammals, that among certain kinds of mammals the colour, and to some extent even the pattern, may be subjected to a considerable variation, as for instance is the case among Genets and Bushbucks. But this is not a very common occurrence, and in most cases the skulls offer very good and fairly constant characteristics. In the following memoir I have been able to prove that the variation of the cranial dimensions and other characteristics among some mammals from the Central African Lake district is extraordinarily great. Such facts as are described below concerning the Chimpanzees, some of the Guenons, the Giant Rats (*Cricetomys*) etc. offer undoubtedly a valuable contribution to the knowledge about the individual variation among the mammals. It is among other things of interest to find that the cranial characteristics of some *Primates* are so very variable.

Of some of the species represented in the collection there are specimens of different age and sex so that a fairly good general view of the ratio of growth and development with increasing age can be obtained, and this is recorded by means of tables of measurements and descriptive notes. To a certain extent it is also illustrated by the accompanying plates.

The capacity of the brain cavity has also been measured, especially for the *Primates*, but also for some of the other species. Now and then morphological notes have been added. It would have been fortunate, if this part of the work could have been further extended, but as the author has been very heavily pressed with much labour of different kinds it has been connected with many difficulties to find time to get it ready even to its present form.

***Gorilla beringei mikenensis* n. subsp.**

N:o 164, 1 old male 14th of May 1914 in the bamboo-forest on the volcano Miken, Virunga mountains (Pl. I, fig. 1).

N:o 165, 1 semiadult male, last molar not quite fully developed, occipital and sagittal crests not developed, the same locality and date.

N:o 166, 1 young male with milk-dentition and the first molar, the same locality and date.

N:o 167, 1 adult female, the same locality and date.

N:o 168, 1 young female with milk-dentition and first molar, the same locality and date.

N:o 39, 1 young female, second molar just cutting the gum, in the bamboo-forest at the foot of the volcano Miken, 27th of Dec. 1913 (Pl. I, fig. 2).

N:o 40, 1 young male, second molar developed, the same locality and date as n:o 39 (Pl. I, fig. 2).

The naked parts of all are black. The scattered hairs of the upper lip of the old male are black. The hairs on the crown are black, but partly with subbasal paler rings,

or basal parts which give a brownish appearance, somewhat like burnt umber, when the fur is parted. On the sides of the face there are about $8\frac{1}{2}$ cm. long black whiskers, the hairs of which are basally greyish. These whiskers are directed downwards and forwards. The dense beard on the chin is about $5\frac{1}{2}$ cm., black but with a brownish tint to the basal parts of the hairs. The lower neck is sparingly haired and the chest to great extent naked. The arms are black with very long hairs, about 15–16 cm. near the shoulder, about 14 cm. at the elbow, about 9 cm. on the back of the carpus then gradually diminishing in length but still very thick to the base of the fingers. The upper back is black, but much grizzled by means of whitish tips and rings to the hair. Across the middle of the back a broad belt of silky greyish white on which area the hair is short, rather thin and adpressed. On the lower back the hair is somewhat longer again, but not more than about 4 cm., black and grizzled with white tips. On the hams the fur is longer, about $8\frac{1}{2}$ cm., shaggier, black, grizzled with whitish tips, which latter appear to be more numerous along the anterior part of the outer side of the thigh so that a light band is formed there. The lower part of the leg is much less grizzled. The belly is black.

The semiadult male (n:o 165) with the last molar not yet fully developed is entirely black, without any grizzling and without the slightest trace of greyish white belt across the back. This belt is thus a token of full maturity. The hair of the middle of the back is about $5\frac{1}{2}$ cm., further down a little longer, at the elbow about 14 cm.

The adult female is black with a slight brownish tint on the sides and lower back in some shades of light. On the upper neck some hairs have paler rings without that this influences the general colour. Around the ischiadic region and on the hams the fur looks at closer inspection finely ticked with greyish brown, but this is produced by the broken and partly split ends of the hairs, a result of wearing. There are no regular or distinct ischiadic callosities, but in the place of such there is a bare patch on either side, and the skin of these is, in counteraction to the rubbing and wearing, thickened and the horny layer has a tendency of peeling off in flakes. It may be said to be ischiadic callosities in being. In the old male there is no trace of such a bare place, but in the semiadult male the hair is worn off on two symmetrically situated small spots in the ischiadic region corresponding to these patches in the female. The young male and female (n:o 40 & 39) are also quite black, but as in the adult female the ischiadic region is finely ticked with brownish by means of broken and split hairs. It is of interest to note that the male has no worn ischiadic patch, but in the female there is a pair of such ones which are very conspicuous, although not quite bare.

The quite young animals (n:o 166 & 168) with milk-dentition and the first molar developed are also black, but tending to »reddish black» (DAUTHÉNAVY: Rep. de Coul. n:o 344, 1), or even »warm sepia» (l. c. n:o 305, 1) on the belly. Of very great interest is the fact that both these infant Gorillas are provided with a small patch of white hair around the anal opening, just like young Chimpanzees. This feature is thus of phylogenetic importance.

The length of the skin of the old male measures from the upper lip to the vent 132 cm.; the corresponding measurement for the adult female is 104 cm. The distance between the finger-tips of the old male when the skin is spread out is 237 cm.

The Mikeno Gorilla is thus somewhat smaller than *Gorilla graueri* MATSCHIE in which the length of the skin of the old male type measured as above is 142 cm.¹

	N:o 164 ♂ old	N:o 165 ♂ semiad.	N:o 167 ♀ ad.	N:o 40 ♂ juv.	N:o 39 ♀ juv.	N:o 168 ♀ pull.	N:o 166 ♂ pull.
Greatest length of skull	310,5mm. ²	260,4 mm	—	223 mm.	219,5 mm.	186 mm.	181,5 mm.
Occipitonasal length	235,3 »	198,8 »	—	183 »	176 »	154 »	154 »
Occipital crest to front of superciliary ridge . .	187,5 »	174,3 »	165,5 mm.	156 »	156,5 »	139,5 »	139,4 »
Basal length	231 »	193 »	—	154 »	141,7 »	119 »	118,5 »
Condylbasal length	255 »	212 »	—	172 »	161,6 »	135 »	137 »
Zygomatic breadth	184,5 »	168,5 »	147,3 »	132,3 »	131,4 »	105 »	103,5 »
Least postorbital width	65 »	77,4 »	66,2 »	66,2 »	68,7 »	68,8 »	72 »
Breadth of brain case	110,5 »	119 »	107 »	102 »	106,7 »	105 »	105,3 »
Breadth of planum nuchale	165 »	148 »	134,5 »	118 »	121 »	—	—
Height of planum nuchale from <i>foramen magnum</i>	102,5 »	69 »	61 »	61,3 »	52 »	47,7 »	42,5 »
Breadth across middle of orbits	144 »	133 »	114 »	103,5 »	101,5 »	86 »	85,5 »
Inner height of orbit	40 »	36 »	38,8 »	37,2 »	35,5 »	36,2 »	32,3 »
» breadth of orbit	40,5 »	37,2 »	35,8 »	33,6 »	33,2 »	34,3 »	31,8 »
Least interorbital width	31,9 »	25,3 »	23,5 »	16,7 »	15,5 »	7,3 »	11,6 »
Median length of nasals	(70?) »	(25,4 »)	—	55 »	51,8 »	40 »	35,5 »
Breadth across alveoles of canines	79 »	72,5 »	—	55 »	54,3 »	44,4 »	48,5 »
Length of palate mesially	137 »	116,5 »	—	93 »	82,3 »	66,5 »	70 »
Distance from palatal arch to <i>foramen magnum</i> .	96 »	81,5 »	76,5 »	58,4 »	58,8 »	50 »	47 »
» » » » <i>occiput</i>	194 »	160 »	152 »	136,5 »	135 »	118 »	112 »
Breadth across <i>p</i> ¹	73,8 »	75,2 »	—	55 »	53,7 »	48,8 »	49,8 »
» inside <i>p</i> ¹	44,4 »	42,9 »	—	33,5 »	31 »	27 »	27 »
» » <i>m</i> ⁸	38,3 »	31,5 »	—	—	—	—	—
Length of upper molar series	72,5 »	71,6 »	67 »	—	—	—	—
» » <i>m</i> ¹	15 »	15 »	15 »	16 »	15,7 »	16,2 »	16 »
Breadth of <i>m</i> ¹	17 »	16 »	15,5 »	17 »	16,9 »	17,3 »	16,7 »
Length of <i>m</i> ²	17,2 »	17,8 »	15,5 »	17,7 »	—	—	—
Breadth of <i>m</i> ²	18,1 »	17,2 »	16,2 »	17,3 »	—	—	—
Length of <i>m</i> ³	17,2 »	17,5 »	15 »	—	—	—	—
Breadth of <i>m</i> ⁸	17,8 »	16,6 »	15,5 »	—	—	—	—
Length of lower molar series	83,3 »	79,9 »	75 »	—	—	—	—
Combined alveolar breadth of upper permanent incisors	45 »	42 »	—	—	—	—	—
Thickness of <i>arcus superciliaris</i> above middle of the orbit	{ 17,3 l, 19,7 r.,	9,7 »	9,7 »	9,2 »	9,4 »	—	—
Length of condyli occipitales	23,2 »	—	18,5 »	—	—	—	—

The measurement in the above table give many interesting hints about the ratio of growth of the Gorilla skulls. A comparison between the skulls n:o 164 (Pl. II, figs 1 & 2, Pl. III, fig. 1) and n:o 156 (Pl. III, fig. 2, Pl. IV, fig. 1) reveal analogous facts as the skins of the same specimens viz. that the characters of maturity are late in their appearance,

¹ Sitzber. Ges. Naturf. Freunde Berlin, 1914, p. 324.

² Or, if the incisors are included, 318 mm.

but probably, when the time comes, develop rather suddenly. As pointed out above the skin of the semiadult male n:o 165 shows no sign of the particular colour of the adult male, although the animal is so old that the third molars of the lower jaw are fully developed, and in the upper jaw m^3 is up on the right side, but cutting the gum on the left. In a similar way the skull n:o 165 lacks many features of the adult. The eyebrow ridges (Pl. IV, fig. 1) are not thicker than those of the adult female, and the orbital walls generally are much less thick than in the old male. The crests, which are so very characteristic for the skull of the adult male Gorilla, are entirely lacking in the semiadult (Pl. III, fig. 2). The development of the musculature of the jaws has not reached further than that a broad median space on top of the skull is left free (Pl. IV, fig. 1). At *sutura coronalis* (which still is open) for instance the distance between the lines of insertion for *musculi temporales* is 23,5 mm. broad. The absence of the crests causes that the *planum nuchale* has not yet received its definite shape and size. *Laminae pterygoideae* are not yet developed as in the adult which also stands in correspondence with the juvenile stage of the musculature. For the same reason the breadth of *ramus adscendens* of the lower jaw is only 64 mm. against 80 mm. in the old male, and *ramus horizontalis* below m_1 is only 34 mm. in the former, against 43,5 mm. in the latter, and so on. Other differences in the dimensions are expressed in the table of measurements.

The brain-case of these Gorillas appears to attain its definite size, or at least its width at a comparatively early period as this measurement is almost as great in the young animals as in the old, especially if it is taken into account that the walls are thickened with age. The anterior portion of the skull grows more than the posterior, and the postorbital constriction becomes more pronounced with age, which stands in connection with the much increasing musculature of the jaws which needs more and more space. During this development the frontal grows forward. In the youngest male skull (n:o 166, Pl. IV, figs 2 & 3) the distance between *sutura coronalis* and the front of the eyebrow-ridge measures in the median line 67,5 mm., in the skull n:o 40 the same measurement is 75,5 mm., and in the semiadult (n:o 165) 88 mm. The above mentioned increase of the postorbital constriction with age in connection with the growth of the musculature of the jaws is quite analogous to the corresponding proceedings in the development of the skulls of f. i. baboons and carnivorous animals. The very long and narrow palate of these Gorillas, more than in other species, (Pl. II, fig. 2) also remind strongly about the same parts of Baboons, so that there might be spoken about a certain analogy in the development of the jaws of these animals. In a young Baboon¹ with milk-dentition the length of the palate is less than a third of the length of the skull, in a somewhat older animal with the first molar developed the length of the palate is contained $2\frac{3}{5}$ times in the length of the skull, and in the adult the same relation is $2\frac{2}{11}$ times. In the young Gorilla (n:o 166) with only first molar developed the length of the palate is contained about $2\frac{2}{5}$ times in the length of the skull, in the male with the second molar developed (n:o 40) about $2\frac{1}{3}$ times, and in the old one (n:o 164) not quite $2\frac{1}{5}$ times. These relations are thus pretty similar. If the length of the palate of these Gorillas is compared with the condylobasal length the former measurement is found to be 51 % of the

¹ *Papio tessellatus* cf. below.

latter in n:o 166, but amounts to 54 % in n:o 40, and about the same, or 53,7 % in the old male (n:o 164). The relation between these two dimensions is thus fairly constant, which means that there is about the same relative growth of the palate and the whole base of the skull.

Although the palate of these Gorillas with regard to length and narrowness — inside m^2 it is even narrower than in some Baboons — much reminds about the same organ of the Baboons, the Gorillas are by far not so prognathous or »dogfaced» as the Baboons. This depends upon the fact that in the latter the whole molar series is situated well in front of the anterior root of the zygoma, but in the Gorillas the posterior portion of the molar series with m^2 and m^3 , and in young animals even m^1 , is pushed back below and behind the root of the zygoma (Pl. III, fig. 1 & 2, Pl. IV fig. 2). By this and in consequence of the size of the molars and their roots the upper jaw and the palate become placed, not on a level with the base of the skull as in the Baboons, but at a considerably lower plane. A consequence of this is that *ramus adscendens* of the lower jaw must be much higher in the Gorillas to reach its place of articulation. In fact the vertical height of the lower jaw through the condyle is considerably longer than the length of the whole *ramus horizontalis* (Pl. III, fig. 1).

The interorbital space increases in thickness very considerably so that it is nearly three times as thick in the old male (Pl. II, fig. 1) as in the young male (n:o 166, Pl. IV, fig. 3) which has only the first molar developed. This increase is not, however, effected by enlargement of the nasals, but by the *processus nasales* of the maxillary. The nasals on the contrary are subjected to a relative diminution with age. In the youngest of the present specimens (Pl. IV, fig. 3) the nasals have at their anterior end, roughly speaking, the shape of a broad triangle which extends its base¹ along the upper margin of the nasal opening and at either corner meets the ends of the premaxillaries. The combined breadth of the nasals is here about 18 mm. This triangular portions tapers very quickly in the lower part of the interorbital region to a narrow shaft of a breadth hardly amounting to 2 mm. About the middle of the interorbital region the nasals are again enlarged to a rhomboidal piece without mesial suture and with a maximum breadth between the lateral angles of 6 mm. At the upper end this rhomboidal piece is again narrowed to a shaft, but this does not quite reach to the *arcus superciliaris*.

The condition of the nasals of the young female n:o 168 is similar.

In the specimens n:os 39 (♀) and 40 (♂) the general shape of the nasals is similar, only the size of the bones has increased, and the shaft-like process above the widened rhomboidal portion has been lengthened, so that it now extends through and reaches the upper frontal surface of *arcus superciliaris*. The mesial nasal suture is still partly open in the triangular lower portion and below the rhomboidal expansion. The greatest combined breadth of the nasals in the triangular portion is in n:o 40 about 26 mm., that of the shaft not quite 3 mm., that of the rhomboidal expansion 7,5 mm., and above the same 2,3 mm. The whole length from the mesial tip at the free margin to the posterior end is about 55 mm.

¹ This base is not a straight line, but has a projecting tip in the middle which, however, does not alter the general shape.

In the semiadult male n:o 165 the conditions (Pl. IV, fig. 1) have altered considerably. The triangular portion of the nasals is almost as before, but at either basal corner the nasals have pushed somewhat forward on top of the premaxillaries so that they more completely surround the upper end of the nasal opening. Their breadth there is nearly the same as in n:o 40 viz. 26,3, but about 24 mm. behind the free basal margin the nasals appear to end in a sharp point. The shaft-like process has thus dwindled away and is broken off. In the place where the rhomboidal expansion ought to have been and above the same to the eyebrow-ridge is a confusion of sutures. It is thus apparent that the posterior parts of the nasals have been encroached upon, partly by the interorbital parts of the maxillaries, and partly by the frontals so that they have been so to say partly broken up in small pieces, partly entirely suppressed.

The skull of the adult female has unfortunately been so badly damaged by the shot that almost the whole facial region has been torn away, but the interorbital region is left. There the part of the nasals which has been termed the shaft is well defined with sutures from the surrounding parts of the maxillaries which extend into the orbits, and this portion of the nasals form a prominent sharp ridge. At the narrowest place of this ridge the nasals measure only 4 mm. The portion which corresponds to the rhomboidal expansion in the young animals can still be discerned, and even above the same remains of the nasals can be followed to the eyebrow-ridge, although the sutures on the sides are irregular.

In the old male (Pl. II, fig. 1) there are no sutures to be seen in the nasal region. The extension of the nasals may thus only be conjectured. The anterior triangular portion is thickened and broadened and, although all sutures have disappeared, the combined anterior width may be estimated to about 40 mm. The triangular portion is continued backwards and upwards into a distinct nasal ridge, but this is broader (about 9,5 mm.) and more rounded off than in the female. In the place where the rhomboidal expansion of the nasals is found in the young, the nasal ridge merges into an irregular thickening of the bone which continues up to the eyebrow-ridge.

In the young Gorilla n:o 166 there is a small piece of bone 21 mm. long and 13 mm. broad intercalated between the supraoccipital and both parietals. In the young n:o 168 there is a similar piece of bone about 13×12 mm., but in this case at the anterior end of the parietal suture between the parietals and the already unified frontal. These are no doubt individual anomalies.

The dentition of the young male n:o 166 (Pl. IV, fig. 4) is as follows:

$$\frac{di^1, di^2, dc, dp^1, dp^2, m^1}{di_1, di_2, dc, dp_1, dp_2, m_1}$$

but inside the incisors and canines there are holes in the bone through which the permanent teeth are to come up. m^2 and m_2 are also partly formed and to be seen in their cavities in the bone. It is of interest to note the great length of the root of dc of the lower jaw, as it measures about 25 mm. in length and is open at the end.

The dentition of the young female n:o 168 is quite similar, but there is in the lower jaw also a hole in the bone inside of dp_1 .

In the young female n:o 39 i^1 are developed and in function. In the lower jaw i_1 have come up, but they are still obliquely crowded and may thus hardly have come into function. m^2 and i^2 are just cutting the gum. The same is the condition of the lower jaw, but the anterior end of m_2 has reached further than i_2 . The calcified germs of m_3 and m^3 are also to be seen in their resp. cavities through holes in the bone. There is also a hole in the bone inside dp_2 .

In the young male n:o 40 m^2 and m_2 are fully developed and in use. The same is also the case with regard to i^2 , but it appears to have been in function a somewhat longer time on the left, than on the right side. In the lower jaw i_2 is on the right side fully developed and functioning, but on the left it has not yet reached the level of the jaw bone. This stands evidently in connection with the narrowness of the jaw which has not space for the simultaneous development of both i_2 . In this jaw the interspace on the left side between i_1 and dc is not broader than between i_2 and dc on the right side, although di_2 on the left side has fully disappeared. There are rather large holes in the bone inside dc , dp_1 , and dp_2 in the lower jaw, but in the upper they are rather small except at the canines.

From these facts may be concluded that the canines probably come as number five of the permanent set, and that the permanent premolars in the lower jaw develop somewhat earlier than those of the upper.

In the semiadult male n:o 165 all teeth are in function except m^3 on the left side and the posterior part of its fellow. The third upper molars are thus the last of the whole set.

In the old male with worn teeth (Pl. II & Pl. III, fig. 1) the lower incisors and canines are more worn than the upper. The left upper canine has been broken off and the right lower, one is completely broken out and the jaw bone has healed so that the alveole has filled up. This mutilation has probably happened in some fight with a rival.

From the easternmost frontier of the geographical area of the Gorillas two different forms have been described, which both distinguish themselves from the western Gorillas by their great palatal length and their long black fur. These are *Gorilla beringei* MATSCHIE¹ from the volcano Kirunga ya Sabinyo north of Lake Kivu, German East-Africa, and *Gorilla graueri* MATSCHIE northwest from Boko at the western shore of Tanganyika.² As the first of these localities appears to be not so very far distant from the volcano Mikeno among the Virunga mountains, where the Gorillas of the present collection have been collected, it could almost be expected that they should belong to the species named *G. beringei*. Undoubtedly they are closely related to the same, but there are also important differences to be found, if for instance the dimensions of the old male skull of the collection are compared with the corresponding ones of the adult male *G. beringei*.

If this comparison had been confined to an examination of the present material and a comparison of its measurements with those recorded by ELLIOT in his »Review of the Primates» I would have been completely led astray. Fortunately I knew, however, that this work has to be handled with care, and that it is best not to rely too much on the

¹ Sitz.ber. Ges. Naturf. Freunde, Berlin 1903.

² Sitz.ber. Ges. Naturf. Freunde, Berlin 1914.

statements of the same. The author just quoted says (l. c. III, p. 222) concerning *Gorilla beringei*: »Skull: total length 320» (mm.). Everybody used to read zoological works would of course take this to mean that the distance from gnathion to occiput measured in a straight line is 320 mm. The dimension quoted appeared, however, compared with others to be rather great and thus to be suspected. I took therefore the liberty of writing to Professor MATSCHIE who very kindly gave the following very important information: »Der Typus von *beringei* ist allerdings 320 mm. lang, wenn man den Schädel von der Kaufläche der Incisivi mit dem Bandmasse über den Scheitel hinweg bis zur Protuberantia occipitalis externa misst (!); aber mit dem Taster erhält man einschliesslich der Incisivi 286 mm. vom Gnathion aus 280 mm. und zwar auf der linken Seite — — — bei der Protuberantia 276 mm.» By this method of measuring without informing the reader about the same ELLIOT's statement is extremely confusing.

Thus instead of being larger than the skull of the Mikeno Gorilla as could have expected that of *G. beringei* is considerably smaller as the following comparison proves.

	<i>Mikeno Gorilla</i> ♂ ad.	<i>G. beringei</i> ♂ ad.
Total length of skull	310,5 mm.	276 mm.
Basal length (Hensel)	231 »	196 ¹ »
Condylbasal length	255 »	217 ² »

This difference is thus very great and can hardly be explained by the fact that the type of *G. beringei* is a little younger. According to a communication in a letter from MATSCHIE it has the basal suture open but »das Gebiss ist vollständig im Gebrauch, auch füllen die Eckzähne ihre Alveolen aus». The length of the palate is in *G. beringei* (fide ELLIOT) 116 mm., but in the Mikeno Gorilla not less than 137 mm., and the latter appears thus to have the longest palate of all known Gorillas. In spite of this length of the palate in the latter, it has the distance from the palatal arch to the occiput 194 mm., while the same measurement (fide ELLIOT) in *G. beringei* is only 173 mm. The length of the upper molar series is in the latter 68 mm. (fide ELLIOT), but in the Mikeno Gorilla 72,5 mm.³ The nasals of *G. beringei* are at the broadest place narrower than the nasal opening, and in the original description MATSCHIE says: »die Nasalen sind breit und verjüngen sich ganz allmählich gegen den freien Rand hin». As can be seen from the description above the anterior end of the nasals occupy the whole upper margin of the nasal opening in the Mikeno Gorilla. They are thus not narrowed in front and considerably broader than in *G. beringei*. The eyebrow-ridge is much thicker, about twice as thick in the Mikeno Gorilla as in *G. beringei*. According to MATSCHIE the greatest breadth of the occiput of *G. beringei* is 145 mm. and *planum nuchale* is 32 mm. broader than high. As is to be seen from the above table of measurements the breadth of the *planum nuchale* of the Mikeno Gorilla is 165 and it is 62,5 mm. broader than high.

¹ Fide ELLIOT.

² Communicated by MATSCHIE.

³ In this connection it ought to be noted that ELLIOT has recorded the length of *m*¹ in *G. beringei* to 17 mm., but according to a communication from MATSCHIE it is only 15 mm.

Through correspondence with MATSCHIE I have also had the pleasure of receiving information concerning the shape of the *jugale* in *G. beringei*. In the latter is the posterior angle between the horizontal ramus of *jugale* and its *ramus frontalis* almost right, while it is much smaller in the adult Mikenno Gorilla. (Cf. the figure plate III.) As the same angle in the younger Mikenno Gorillas comes nearer to a right angle than in the old, *G. beringei* represents in this respect a more juvenile stage.

According to MATSCHIE there is an angular ridge between the inner surface of the lateral wall of the orbit and the facial or front surface of *ramus frontalis* of *jugale*, and these two surfaces stand in a right angle to each other.¹ In the Mikenno Gorillas (and in this respect young and old are alike) on the other hand the interior surface of the orbit is quite smoothly rounded off and passes gradually into the semicylindrical facial surface of *ramus frontalis* of *jugale* (Pl. II, fig. 1). *G. graueri* MATSCHIE appears to more nearly resemble the Mikenno Gorilla in this latter respect, but otherwise these two differ very much from each other as will be shown further below.

With regard to the colour of the fur the adult Mikenno Gorilla ♂ differs from *G. beringei* by the absence of »red» as well at the tips as at the bases of the hairs of the head, neck, and legs. From *G. graueri* the Mikenno Gorilla differs by its greater dimensions in many respects. Although the total length of the skull of the former is almost similar, or 312,5 mm, its condylobasal length is maximum 223 mm. against 255 mm in the Mikenno Gorilla, and in a similar way the basal length is resp. 201 to maximum 210, and 231 mm; the width of *planum nuchale* resp. 151, maximum 154, and 165, mm.; the palate length resp. 128 (maximum), and 137 mm., the distance from palatal arch to occipital crest resp. 187 and 194 mm.

I am indebted to Professor MATSCHIE for several of these measurements of *G. graueri*, which have not been published before. They are based on a material of three adult specimens. The same author has at the same time kindly communicated that in *G. graueri* »die Reihe der Schneidezähne im bleibenden Gebisse höchstens 4,2 cm. breit; die Gelenkhöcker am Hinterhaupte bei den ♂ 2,4 cm. bei den ♀ 2,1 cm. lang». In the Mikenno Gorilla the series of upper incisors has a length of 4,5 cm. basally, and the length of *Condylus occipitales* measures in ♂ 2,32 cm., and in ♀ 1,85 cm.

Considering the differences recorded above and the fact that the Gorillas are rather stationary and now live isolated in the upper parts of the mountain forests, chiefly in the bamboo region — at least this is the case with the Mikenno Gorilla — it appears probable that this isolation has brought about a certain differentiation between the different tribes. Therefore, I cannot identify this Gorilla with any of the known eastern forms, but regard it as a separate subspecies which may be called *Gorilla beringei mikenensis*.

The capacity of the brain-cavity of these Gorillas from Mikenno has been measured by means of hemp seed, since *fissura orbitalis* etc. has been closed with a little cotton, and the following results have been obtained:

The young female with milk-dentition (n:o 168)	417 cem.
The adult female (n:o 167)	435 »

¹ — — — »die Aussenwand der Orbita steht zur Fazialfläche des Ramus im rechten Winkel» (MATSCHIE).

The young male with milk-dentition (n:o 166)	470 ccm.
» » » » m^1 and m_1 (n:o 40)	465 »
The semiadult male (n:o 165)	597 »
The old male (n:o 164)	585 »

These measurements prove in the first rank that the female brain is much smaller than the male one which, of course, at least partly stands in direct relation to the difference in bodily size of the two sexes. Nevertheless it is of great interest to find that the young male in milk-dentition, which has not yet by far attained so great bulk as the adult female¹, already is her considerably superior with regard to the volume of the brain-cavity. It is also rather astonishing to find that the young female Gorilla still in milk-dentition² has a brain-cavity which is nearly as great as that of the adult female, or 94 % of the same, although the difference in size between the specimens is considerable. This fact appears to indicate that the brain of the female Gorilla grows to nearly its definite size pretty early, but then comes to a standstill.

The brain-cavity of the young male Gorilla in milk-dentition and that of the young male with the first molars developed³ is practically the same. That the latter even is a little smaller is no doubt a case of individual variation without importance. During the period of life in which the second and third molars come to full development the brain of the male Gorilla, unlike that of the female, appears to be subjected to vigorous increase in size, as may be concluded from the fact that the brain of the semiadult male is so very much larger than that of the younger specimens. The capacity of the brain-cavity of the younger males is only 79 %, or less of that of the semiadult. But in that semiadult stage the brain of the male Gorilla appears to have attained its full size. Whether it actually decreases again with age as the above measurements appear to indicate, or not, is difficult to decide, as the difference in this direction, expressed above, may be due only to individual variation. The growth of the Gorilla brain is, as it will appear, periodical.

The female Gorilla child n:o 168 and the male n:o 166 appear to be of almost the same age to judge from the development of the teeth and the skull, although the female skin is larger, and this specimen thus is older. The brain capacity of the female is, however, only about 88 % of that of the male, which fact thus proves that the superiority of the males in this respect is pronounced at a rather early period, and it is increased still more with age as is shown above.

SELENKA has in his valuable memoir »Menschenaffen (Anthropomorphæ), Studien über Entwicklung und Schädelbau»⁴ published measurements of the capacity of the brain-cavity of 48 female and 50 male Gorillas, all adult. In the females the capacity varies according to SELENKA between 380 and 530 ccm. with an average volume of 450 ccm. The female Mikenno Gorilla has thus a brain cavity which is somewhat below the average. According to the same author the capacity of the brain-cavity of the male Gorillas varies between 420 and 590 ccm. with an average of 510 ccm. The male Mikenno Gorillas reach

¹ The length of the skin from upper lip to vent is about 57 cm. in the former but 104 cm. in the latter.

² Length of the skin measured as above 67 cm.

³ Length of the skin about 86 cm.

⁴ Wiesbaden 1898—1900.

thus in this respect to, or even above the maximum and stand high above the average.¹ A result of this is that the difference between the male and female brain-capacity, which in the Mikeno Gorillas is about 150—162 ccm., is very much greater in this race than the average which is put to only 60 ccm. by SELENKA.

According to Captain E. ARRHENIUS the Gorillas are rather numerous on the volcano Mikeno. At one opportunity he met with a band of about 30. They are, however, very shy and live in such localities where it is extremely difficult for a man to penetrate.



Fig. 1. The Volcano Mikeno, where the Gorillas live. The summit is covered with snow.

Capt. ARRHENIUS and his men had to crawl on all four in single file through the thickets of bamboo, and it was therefore difficult for him to get space enough to shoot when he struck the band of Gorillas. He saw once a large male who hurried away on his hind legs with a big pole in his hand. When disturbed the Gorillas are said to take their refuge higher up on the mountain in still more unaccessible places.

Captain ARRHENIUS wrote in a letter about the occasion when he surprised the band that they made a tremendous noise — »they barked, screamed and babbled».

Captain ARRHENIUS has further given the following information concerning the Gorillas of Mikeno, which are called »Ingagi» by the natives in the language »kiniaruanda». They live in bands consisting of 20—30 individuals, and do not remain more than about a month at the same place. When they have eaten up what they can find in one tract of

¹ The capacity of an old Gorilla skull from Cameroon in this Museum is 560 ccm.

the forest they leave for another. They feed on »ibizengozengo» and »ibitoke b'ingano». The latter means young shoots of bamboo. The Gorilla makes a kind of nest (»buriri») among the bamboo and puts on top of this slender twigs of bamboo (»ubusaza»).

The natives are more afraid of the Chimpanzee than of the Gorilla, because the former is apt to attack a man without offence, the latter not. If, however, the Gorilla has been attacked, it defends itself bravely and tries to tear its foe to pieces with its teeth. The natives hunt the Gorillas to obtain their skin which they use for wrapping up their copper thread etc., or for revenging some relative. Thus when a man from Sangana had been killed by a Gorilla his family killed five Gorillas in revenge. The natives hunt Gorillas with the aid of dogs. The dog bites the Gorilla and returns to his master who waits for the Gorilla with the spear ready. He throws the spear at the Gorilla and runs away. The dog repeats the manoeuvre, until the animal is killed. The natives do not eat the meat of Gorillas, nor that of Chimpanzees.

***Anthropopithecus* cf. *cottoni* MATSCHIE.**

The valuable material of Chimpanzees which Captain ARRHENIUS has brought home consists of the following specimens:

- N:o 70, 1 ♂, old. »Forêt dans le montagne près de Rutshuru (5 heures), fevrier 8, 1914. Il a fallu trois coups de mauser pour l'abattre; il a voulu attaquer. La femelle blessée s'est enfuite avec un jeune.»
- N:o 73, 1 ♂, young, with milk-dentition and first molar; »forêt dans le montagne près de Rutshuru le 21/2 1914». This is according to Capt. ARRHENIUS's mark in his list identical with the young animal observed together with the old male killed 8/2 1914.
- N:o 160, ♀ ad., skull, skeleton and foetus, Rutshuru, March 1914.
- N:o 161, ♀ ad., Rutshuru, 8 of April 1914.
- N:o 162, young female with milk-dentition, belonging to the adult female just mentioned and taken together with her.
- N:o 163, ♂ ad., Rutshuru, 9 of May 1914.
- N:o 178, ♀ ad., Rutshuru, 15th of July 1914.
- N:o 179, ♀ young, child of the foregoing, with milk-dentition.
- N:o 181, ♀ ad., Rutshuru, 1/8 1914.
- N:o 224, ♀ ad., »Rutshuru, voir (70), Dec. 12, 1914».

Thus the whole series is collected at Rutshuru probably at the same locality. Especially it appears probable that the last, n:o 224, is killed at the same place as the first because ARRHENIUS has written »voir (70)» in his list under that number, and this remark, I think, must be understood as referring to the locality, where n:o 70 had been shot. This is of interest, because among the adult animals these two are most dissimilar inter se, but on the whole the variation is very great as will be shown below.

The young ones have a completely black pelage, but the chin is greyish white and there is a white patch above and surrounding the anal opening. The colour of the naked

face is reddish brown, the colour of the dry skin somewhat resembling the palest shade of »brownish drab» (DAUTHÉNAY, Rep. de Coul. 302, 1), or in other places a light shade of »burnt umber» (l. c. 304, 1 & 2). The ears have also a similar tint. It is of course difficult to say whether this corresponds to the colour of the living animal, or not, but evidently it has had a light brownish face, perhaps with a russet tinge.

The old animals have the naked parts much darker, so that at the first look they appear to be quite black in the face. One of the specimens, n:o 224, is really quite black all over the face and on the ears. In two others, n:s 161 & 181, the face is quite black, but on the cheeks the colour might perhaps be termed »reddish black» (DAUTHÉNAY 344, 2). In n:s 178 & 163 the cheeks are still somewhat paler, some kind of russet brown, or a pale shade of »brownish drab» (302, 1) spotted with black. The brown is there also more or less found around the eyes. In the oldest male, n:o 70, the brown dominates, only the centre of the face being black, and the cheeks and the crown brown, mottled with black.

In the young animals only the face is naked, already the fore-head a little above the eyes being sparingly beset with black hairs. All the adult animals display baldness in various degrees and differ by this characteristic from *Anthropopithecus adolfi-friderici* MATSCHIE from the Bugoje-forest northeast of Lake Kivu about which MATSCHIE says:¹ »Eine Stirnglatze ist nicht vorhanden.» In the female 224 and the male 163 there is a triangular bald patch with the base at the eyebrows and extending with the point about 6 ½ cm. backwards from a line connecting the corner of the eyes. In the female 161 this patch is a little broader and more irregular, but does not extend further back. In the females 181 & 178 the bald patch is both broader and about 1 cm. longer so that it reaches to the level of the ears. In the male n:o 70 the bald area is still larger, extending broadly about 10 ½ cm. from the line through the corner of the eyes. The baldness increases evidently with age, n:o 178 being the oldest female and n:o 70 the oldest male.

In the young ones the black hairs surrounding the face are very long so that about 8—8 ½ cm. long whiskers are formed on the sides of the face, almost concealing the ears, behind which there are also equally long and broad tufts, standing out 8—9 cm. from the nape. On the crown the hair only grows to a length of about 2 ½ cm. and is not laid in any particular direction, nor erect. The whiskers begin at the sides of the forehead and cover from there the buccal region. They are standing out straight laterally in their upper parts, but become gradually more and more directed forwards and downwards and thus merge into the much thinner, black beard which is directed forward from behind the greyish white chin, the hair of which latter is short. The hairs on the neck below the ears are also very long and directed forward so as to support the whiskers from behind. The hair of the upper back is about 7—8, on the lower 5—6 cm. The white hair above the vent about 5 ½, below the same about 3 ½ cm. The fur is comparatively soft, but not at all woolly or silky.

In the adult specimens the same general arrangement of the hairs may be recognized, but it is by far not so conspicuous, because the hairs around the face are not at all elongate, or at least not in same degree as in the young ones. In the old male (70) the hairs of

¹ Ann. Soc. roy. Zool. et Malac. de Belgique, t. XLVII, 1912.

the nape, corresponding to the postauricular tufts of the young, are only about 6 cm., and in the other male (163) they are still shorter, about $4\frac{1}{2}$ cm. and do not reach beyond the margin of even the dry ear. The length of the hairs forming the side whiskers is only about 3 cm., and they are not standing out, but chiefly directed downwards. On the whole throat from below the ears, except on the grey chin, the $2\frac{1}{2}$ —3 cm. long hair is directed forwards forming a kind of stubby beard.

In two of the females (161 & 181) the hair behind the ears, and on the nape attains a length of about $6\frac{1}{2}$ —7 cm., in the others it is partly shorter. On the whole, however, the postauricular tufts, and the fur of the nape and the neck appear better developed in the females than in the male n:o 163. The side whiskers, although present and of the same general arrangement, are somewhat less pronounced in the females, but the forward directed hairs of the throat, which to a certain degree form a beard behind the chin, are present, but softer than in the males. The hair on the crown around the bald patch is shorter than elsewhere.

The length of the hair on the middle of the back is in the females n:s 161, 181 & 224 about 6—7 cm., in the oldest male (70) and female (178) about 5 cm., and in the male n:o 163 only about $3\frac{1}{2}$ cm., but the fur of the last one is perhaps more dense than in the others. The shortness of the fur of this male appears rather remarkable. It is possible that it depends upon the season, but it was shot in May and a female shot a month earlier had long fur, and the same was the case with another collected in July.

With increasing age the fur of some parts appears to become scantier than in the young animals not only on the head, but also on the throat. This is especially conspicuous on the old male in which also the hind neck is almost bare, only with scattered hairs.

The colour is also gradually changed with age, the adult not being quite black as the young. The female n:o 224 forms, however, an exception because, although it is by no means the youngest among the adult, it is practically black all over. Even among the sparingly scattered hairs on the chin there are at least as many black as whitish ones. On other parts of the body if a closer inspection should reveal brownish tips of some hairs it is as a rule the broken and faded ends of black hairs. Next in general blackness comes the female n:o 161. Its head has a decided brownish tint which approaches DAUTHÉNEY's »warm sepia» without being quite identical with the same. The beard on the throat is paler and somewhat more greyish brown, the scattered hairs on the chin are whitish grey. The arms and hands are quite black, but the back is overlaid with a brownish tint produced by brown tips to some hairs, the hind legs are similar, though with less brownish. A great number of these brownish hair-tips, but not all, belong to old, broken and faded hairs.

The female n:o 181 is pretty similar, but is more greyish brown on the lower back and on the hind legs.

The old female n:o 178 has the short hairs on the upper parts of the head light brownish grey, the whiskers dark brown, the arms and upper back black mixed with brownish tips. From the middle of the back the colour gradually fades more and more so that in the pelvic region it is a rather pale brownish grey. The hind legs are darker brownish grey. The breast and belly are blackish brown.

The male n:o 163 is very dark. Its head, arms, breast, and upper back are almost black, grizzled with light brownish tips to a number of the hairs (least on the arms). On the lower back these light tips dominate so that it is quite overlaid with brownish grey. The same is also the case with the hind legs, although not quite in the same degree.

The old male (n:o 70) has the remaining hairs on the upper side of the head partly grey, partly blackish. The whiskers are in their upper portion blackish, in their lower brownish grey. The arms and upper back are blackish, but mixed with whitish grey hairs. The colour of the back becomes gradually paler towards the pelvic region and is there very pale brownish grey, in some lights it might be termed isabelline grey. The upper parts of the thighs are like the middle back, but the greater portion of the hind legs is just as pale as the lower back. In the old specimens where the pale brownish grey colour dominates on some parts of the body the hairs themselves are to great extent pale horn-coloured, unlike the condition in other specimens which only are more or less grizzled with brownish. In the latter as already has been mentioned the brownish tint is produced at least partly by the faded broken and often split ends of the hairs. Whether the pale ends of the hairs are intact or broken they are somewhat shiny by which the effect produced by them is greater than it otherwise should have been.

The description thus given proves that the fur and its colour is rather variable in these Chimpanzees. Partly this variation is explained by the difference in age, the old ones gradually becoming more bald-headed and more pale brownish grey on the lower back and the hind legs. The almost complete blackness of the rather old female n:o 224, and the shortness of the fur of the male n:o 163 appear, however, without accordance with other facts and indicate a strange variability which is also displayed by the skulls as will be set forth below.

All the adult specimens are provided with very well developed ischiadic callosities. These are largest in the old ones, f. i. 7×4 cm. in the old male, $6,5 \times 3,5$ cm. in the oldest female. In the least old female (n:o 181) the dimensions of these callosities are about $4,5 \times 2,3$ cm. The callosities are so thoroughly developed that they can be seen very plainly from the inner side of the skin as well. In the young animal with milk-dentition the callosities can hardly be more than traced on the skin.

The length of the skin of the old male (70) measures from upper lip to opening about 93 cm. The same measurement of the other male is about 91; that of the largest female (181) about 89. The other female skins have this dimension about 83—84 cm.

The ears are small, basally at the insertion measuring from about 35 to 40 mm. on the skins and probably the longest diameter from one free lobe to another does not much, if at all, exceed 50 mm.

These skin measurements prove that this Chimpanzee is smaller than *Anthropopithecus purschei* MATSCHIE from the forest between Lake Kivu and Lake Luhondo, German East Africa. The same fact is corroborated by the cranial measurements below. *A. purschei* has a cranial length to gnathion of 205 mm. *A. purschei* is also said to be »ohne Stirnglatze».

A. cottoni MATSCHIE has been described from specimens which had not reached maturity and is thus insufficiently known. As the description of *cottoni*, as far as it is

known, does not disagree with the present specimens in any important point, I have used this name for the Chimpanzees of Rutshuru especially as the type locality of *colloni*, »Sassa-Fluss, südöstlich des Albert-Edward Sees», is not geographically very distant from Rutshuru.

Cranial dimensions of adult Chimpanzees from Rutshuru.

	♂ n:o 70	♂ n:o 163	♀ n:o 160	♀ n:o 161	♀ n:o 178	♀ n:o 181	♀ n:o 224
Total length of skull	197,5 mm	186 mm	184,6 mm	186 mm	179,5 mm	189 mm	177 mm
Occipitonasal length	151 »	141,8 »	139,5 »	141 »	136 »	143,5 »	134,8 »
Basal length	135,5 »	131,5 »	—	129 »	125 »	129 »	123,5 »
Condylbasal length	150,5 »	145 »	142,3 »	144,6 »	141,5 »	143,5 »	137,5 »
Zygomatic breadth	123,5 »	131 »	123,2 »	113 »	121 »	117,5 »	—
Least postorbital breadth	69,7 »	65 »	69 »	66,6 »	67,5 »	71 »	66,5 »
Breadth of brain-case	100 »	100 »	100 »	92,4 »	96,5 »	98,5 »	93,7 »
Breadth across alveoles of canines	58,4 »	65,5 »	54 »	50 »	51 »	51,7 »	51,2 »
» » outside of <i>m</i> ³	54,7 »	53,6 »	58 »	51,3 »	55 »	52,3 »	55,3 »
Length of palato mesially	75,8 »	78,4 »	—	73,7 »	71 »	71,8 »	69,5 »
» » upper molar series	46,3 »	43,1 »	44,5 »	43,5 »	39 »	44,8 »	40,1 » ²
» » true molars	31,7 »	29,5 »	30,5 »	30,2 »	26,3 »	30 »	28,2 »
» » lower molar series	51,5 »	48,2 »	49,5 » ¹	51 »	43 » ¹	51 »	44,8 (44) »
» » true molars	34 (33,4 »)	31,7 »	32,7 » ¹	34 »	28,4 » ¹	33,7 »	30,1 »
Breadth across orbits	98,5 »	103,7 »	100,1 »	94,3 »	90,2 »	101 »	—
Least interorbital width	18,8 »	19,8 »	14,2 »	16 »	13 »	18,3 »	11,6 »
Height of orbit inside	27,2 »	32 »	37,7 »	28,8 »	37,4 »	32,7 »	32 »
Width » » »	32,3 »	31 »	35,5 »	32,7 »	32 »	32,7 »	33,2 »
Breadth of <i>m</i> ³	11 »	10,8 »	11,2 »	11,2 »	9,5 »	9,8 »	9,7 »

The measurements recorded above show a very considerable variation chiefly with regard to the orbits, interorbital space and the teeth.

The shape of the orbits influences the superciliary ridge which in all is very pronounced, but with differently arched outline. In the ♂ n:o 70 (Pl. V, fig. 1) it forms an even arch with no concavity above the interorbital space. The ♀ n:o 181 shows almost the same condition, but in the ♂ n:o 163 there is a slight depression above the interorbital region, or perhaps more correctly the superciliary arch above each orbit is independently a little more elevated than mesially. In the ♀ n:o 161 (Pl. V, fig. 3) about the same condition prevails, but in the females n:s 178, 224, and 160 (Pl. V, fig. 4) the arches above the orbits are considerably raised, and in the last the mesial concavity amounts to nearly 4 mm. which does not sound much, but nevertheless gives a quite strikingly different aspect of these skulls, effected by the simultaneous raising of the eyebrow ridges with a mesial concavity between them and the increased height of the orbits. This enlargement of the orbits is, however, only produced by the raising of the superciliary ridges, and therefore the upper portion of these orbits looks very shallow.

¹ Not counting extra anomalous molar.

² Premolars wanting, thus approximately from alveoles.

It is also of interest to note that the skulls with raised eyebrow-ridges (thus 178, 224, and 160) at the same time have a considerably narrower interorbital septum than the others. There appears consequently to exist a correspondence between these characteristics.

The variation with regard to the teeth is of two different kinds viz. partly an evidently individual anomaly conspicuous by the presence of supernumerary molars, and partly a variation in size of the molars. The former anomaly, although interesting in itself, cannot, of course, be of any taxonomic value, but will be described further below, the latter again exhibits differences which are analogous to such as often are used for distinguishing different races, or even species.

If the measurements of the molars of the females as recorded in the table are examined, we find at the first look that two females viz. n:o 178 (Pl. VI, fig. 2) and n:o 224 (Pl. VI, fig. 4 a) have much smaller molars than the others (f. i. Pl. VI, fig. 4 b). These two females have somewhat smaller skulls and have also a narrow interorbital space and the superciliary ridge raised above each orbit but with a mesial concavity. There is, however, a third female (n:o 160) with such superciliary ridge, very large orbits and comparatively narrow interorbital space, and that one has large molars. There is thus no certain correlation between small molars on one hand, and a doubly arched superciliary ridge and a narrow interorbital septum on the other hand. Nor do the characters mentioned stand in correlation to the colour of the fur as one of the small-toothed, n:o 224, is the blackest, and the other, n:o 178, is the greyest among the females.

In the two males as well the molars are considerably different in size. But in this case the small-toothed specimen (163) has at least not narrower interorbital space than the large-toothed. Thus, although the differences in certain cases, for instance with regard to the breadth of the interorbital space, and the size of the molars, certainly are great enough to appear to be of distinguishing value between different races the lack of correspondence, as set forth above, upsets every attempt of separating these specimens in two racial groups, as for instance a large-toothed and a small-toothed.¹ In spite of all differences it appears impossible for the present but to regard all as individual variations of one and the same race. This is of very high interest as very seldom wild mammals from one and the same place vary in such a remarkable degree.

If not the molars generally, but one of them is compared in the different specimens a similar result is obtained. It is best to use m^3 for this comparison as it is most variable and at the same time it is smaller than the first and second true molars. A look at the table of measurements above, in which the breadth of m^3 is recorded, proves that this dimension varies not a little. The greatest interest is, however, connected with the fact that this variation appears to be rather independent of the size of the other molars. Thus the female n:o 181 is decidedly large-toothed, but its m^3 are among the smallest. The general shape, and the number and size of the cusps are also variable characteristics, but seemingly independent of others. The normal outline of the crown of m^3 is, of course, more or less square, but in n:o 181 it is rounded. Normally there ought to be four cusps,

¹ Such an animal as n:o 160 could in such a case only be explained as a hybrid!

two outer and two inner, but their development is variable. Especially the posterior inner cusp is often reduced in size, or even lacking. This is so irregular that the same animal may have four cusps on one, but only three on the other side, and this may happen in large-toothed as well as in small-toothed specimens.

The size of p^1 is variable as well. In the small-toothed female n:o 178 its greatest transverse diameter is 8,5 mm. on one side, 8,8 mm. on the other; in the large-toothed female n:o 160 it is resp. 9 and 9,2 mm.; in n:o 181 about 9,8 mm., and in n:o 161 resp. 10 and 10,4 mm.; in the male n:o 70 the same dimension is 11,4 mm., and in the male n:o 163 only 9,2 mm.

The lower jaw is also extremely variable in shape. In the old male, n:o 70, the distance from the upper edge between both i_1 to the knob at the posterior margin of the symphysis measures 41,2 mm. and in the other male, n:o 163, 42,4 mm., but in the females the difference can be greater as in the two large-toothed females, n:o 160 and 161, where it is resp. 45 and 41,6 mm., and in the two small-toothed females resp. 40,3 and 39 mm. The height of *ramus horizontalis* is in the others generally about 26 mm., or a little more, but in the small-toothed n:o 178 it is 28, and in the other small-toothed n:o 224 only 22,4 mm.

The variability extends, however, also to many other parts than those recorded in the table, or mentioned above.

Foramen magnum is for instance in some specimens large, in others small, in some oval, in others round (quite circular in n:o 224), or even heart-shaped (n:o 178). In correlation to the width of *foramen magnum* the breadth across *condyli occipitales* is very different in different specimens. It is smallest in the old male n:o 70 viz. 37 mm., and in the large-toothed female n:o 161 viz. 37,4 mm. In the other male n:o 163 it is 39 mm. In the small-toothed females n:o 178 and 224 it is resp. 38,4 and 39,3 mm., and in the large-toothed females n:o 160 and 181 resp. 39,2 and 44 mm.

Strange to say variation with regard to supernumerary molars appears to be a less rare occurrence among the Anthropoid Apes than could be expected. BATESON has in his book »Materials for the Study of Variation»¹ recorded not less than four Chimpanzees with supernumerary molars, which in three of the cases were situated in the upper, and in one in the lower jaw. Among 8 full-grown Westafrican skulls now in the collections of the R. Nat. Hist. Museum one has a quite small m^1 on the left side. The present author has also at earlier opportunities seen supernumerary molars in Chimpanzee skulls from Debundseha, Cameroon. In the series of 7 fully adult Chimpanzee skulls which Captain ARRHENIUS has brought home from Rutshuru not less than 2 present such an anomaly, viz. the numbers 160 (Pl. VI, fig. 3) and 178 (Pl. VI, fig 2). Both these are females, and it is of interest to note that the former is large-toothed the latter comparatively small-toothed (conf. above).

N:o 160 has a supernumerary molar as well in the upper as in the lower jaw. That of the upper jaw is, however, more teratological as it is situated laterally of the molar series outside of m^2 of the left side, which has been pushed inwards a little but is of nor-

¹ London 1894.

mal size. It has already during lifetime had the greater part of its crown broken, or worn off, but it clings to the jaw bone by means of two roots. The supernumerary molar of the lower jaw is m_4 of the left side, situated in a continuous series with the other molars (Pl. VI, fig. 3). Its crown is nearly square measuring 9 mm. in length by 8,8 in breadth, and has four cusps, the anterior pair of which is somewhat greater and connected by a ridge.

The skull n:o 178 has a well developed m_4 on either side of the lower jaw (Pl. VI, fig. 2). These are, however, smaller than the ordinary molars, measuring $7,2 \times 6,7$ mm. They have only three cusps each, and these are on the right m_4 subequal, but on the left the outer of the anterior pair is dominating, and much larger than the others. As these supernumerary molars are somewhat worn, especially the large cusp on the left side, it is evident that they have been in use working against m^3 when the lower jaw moved.

SELENKA has in a very interesting paper »Die Rassen und der Zahnwechsel des Orang Utan»¹ recorded many important facts also concerning supernumerary molars which he has found in 20 % of 194 adult skulls of Orangs. Some of his statements appear to refer to these Chimpanzees as well, viz. that supernumerary molars are more often found in the lower jaw than in the upper, and more often on the left than on the right side, but this may be mere coincidence as it is not corroborated by BATESON's records.

SELENKA regards the fourth molars of the Anthropoid Apes as »Neubildungen» and concerning the cause of their appearance he utters as follows. »So gewagt es im allgemeinen ist, die Entstehung eines Organs auf die Wirkung mechanischer Zug- und Druckkräfte zurückzuführen, so dürfen solche Erklärungsversuche doch nicht von der Hand gewiesen werden, wenn sie sich auf blosse Modificationen vorhandener Organanlagen beziehen. In diesem Sinne scheint es erlaubt, die Veranlassung zur Entstehung neuer Zähne in der zunehmenden Verlängerung der Kiefer zu suchen. Die Vergrößerung der Kaumuskeln bewirkt eine Vergrößerung ihrer Ansatzflächen am Kiefer, und die auffallende Verlängerung des horizontalen Astes des Unterkiefers, welche gegen Schluss des Zahnwechsels stattfindet, wird auch das Hinterende der Zahnleiste in Mitleidenschaft ziehen können und derselben Gelegenheit bieten, die ihr innewohnende Fähigkeit zu entfalten, nämlich Zahnkeime zu entwickeln.» The explanation thus offered appears to be plausible.

The capacity of the brain-cavity of the Chimpanzee skulls of the present collection has been measured by means of hemp-seed after closing *fissura orbitalis* etc. with a little cotton, and the following results have been obtained by this.

A young female with milk-dentition (n:o 179)	296 ccm.
The adult female n:o 178	335 »
» » » 224	345 »
» » » 161	348 »
» » » 160	400 »
» » » 181	400 »
» » male 163	383 »
» » » 70	427 »

¹ Sitz.ber. d. Kgl. Akad. d. Wiss. Berlin, 1896, p. 381—392.

From this table can be seen that with regard to the capacity of the brain-cavity these Chimpanzees can be arranged in two groups one with smaller, and one with larger brain. One of these groups comprises three females and a male, the other two females and a male. The difference in volume of the brain-cavity is with regard to the females more than 50 ccm., and with regard to the males about 44 ccm., thus in both cases quite considerable. The question presents itself then again, is this difference due to racial distinction, or not? For the elucidation of this it is necessary to investigate, if there exists any correlation between this difference in brain-capacity and the variation of other characteristics which has been discussed above. Such an investigation is facilitated by the table of measurements above. From this we learn that two of the small-brained females (n:o 178 & 224) have small teeth, but this is not at all the case with the third (161). The first two of these small-brained females have raised eyebrow-ridges and thus comparatively high orbits, the third again (n:o 161) (Pl. V, fig. 3) has the superciliary arch very little raised and therefore comparatively low orbits. On the other hand especially one of the large-brained females (n:o 160, Pl. V, fig. 4) has raised eyebrow-ridges and very large orbits.

The breadth and shape of the palate is also very different in the different specimens. Two of the small-brained ones (n:o 178 & 224) have a comparatively broad and flat palate with a width inside m^2 of about 36,5 mm., but the third (n:o 161) has the narrowest and most vaulted palate of all with a width inside m^2 of 28 mm. On the other hand the corresponding measurement of one of the large-brained females (n:o 181) is 34,5 mm, but in the other (n:o 160) it is 37,5 mm. The old large-brained and large-toothed male has the palatal breadth inside of m^2 34 mm.; in the comparatively small-toothed and small-brained male the same dimension is almost similar or 34,5 mm. In such a case it is evidently impossible to use this character for dividing the present material of Chimpanzees in two racial groups. The longest palate measuring 73,7 mm. is found in one of the small-brained (n:o 161), but also the shortest palate, 69,5 mm, belongs to a small-brained specimen (n:o 224).

The greatest width of the interorbital septum is found in one of the large-brained (n:o 181) with 18,3 mm., and one of the small-brained (n:o 161) with 16 mm., next comes in this respect a large-brained (n:o 160) with 14,2 mm., then again two small-brained (n:o 178 & 224) with resp. 13 and 11,6 mm.

This complete irregularity of the variable characteristics makes it plainly difficult to attribute any racial value to the differences in the size of the brain-cavity as expressed above. This does not exclude that in other cases a difference with regard to the capacity of the brain-cavity may be of racial value as SELENKA has proved to be the case with the Orangs.

Among the collections of the R. Nat. Hist. Museum there are, however, some other Chimpanzee skulls which appear to indicate a considerable variability among these animals even with regard to the brain-case and its capacity. To prove this the following cubic measurements may be quoted concerning some Chimpanzee skulls collected at Cape Debundseha, Cameroon. They are all from the same locality. The male, at least, belongs to the *Anthropopithecus calvus* group. To the female skulls there are no skins,

but two other skins from Debundscha belong also to the *calvus* group, and it is therefore most probable that all three skulls represent the same race.

Old female from Debundscha	385 cc.
" " " " " " " " " "	460 »
male " " " " " " " " " "	323 »

These cubic measurements are very striking, because the brain-cavity of the male¹ is much smaller than that of the females, and its capacity is even below the minimum — 350 ccm. — for male Chimpanzee skulls according to SELENKA. On the other hand the largest female has a capacity which is above the maximum — 450 ccm. for female Chimpanzee skulls according to the same authority, and not far from the maximum even for male skulls (480 ccm.).²

The small-brained female Chimpanzees from Rutshuru have a capacity of the brain-case which is not much above the minimum — 320 ccm. — according to SELENKA, but the large-brained are above the average — 390 ccm. — in this respect. The largest of the males is also above the average for males, or 420 ccm.

The average difference in capacity between male and female Chimpanzee skulls SELENKA puts to 30 cm. Broadly speaking a similar difference in capacity exists between the largest male and the large-brained females on one hand, and between the smaller male and the small-brained females on the other.

As quoted from Captain ARRHENIUS's notes the old male Chimpanzee was ready to attack when shot. The natives also fear the Chimpanzee, which is called »Impundu» in the Kinaruanda language, and say that he often will attack a man. They say also that the Chimpanzees use sticks or branches for fighting, how true this might be is uncertain. The Chimpanzees of this region make nests in the crown of high trees, just as is known about such apes from other places.

Colobus occidentalis ROCHÉBRUNE.

A very fine series partly from Rutshuru, and partly from Beni. Of those from the former place eight are males in different stages of age, four are females, and one quite young (♀). All these specimens are signed »la Shasha rivière — petit forêt», and with exception of one male shot $16\frac{1}{2}$ 1914, the others have been collected $27\text{---}28\frac{1}{2}$ 1914. The three specimens from Beni are all males shot in January 1914.

The latter are larger than the others, their skulls measuring resp. 119, 122 and 124 mm. in total length, while none of the male skulls from Rutshuru attains a greater length than 115 mm. Otherwise no distinct difference is to be seen. Both in specimens from Rutshuru and from Beni there is some variation with regard to the extension of the white on the sides of the head as in some almost the whole ear is surrounded by white except at the upper margin, while in others the greater part of the ear is implanted in the dark

¹ This Chimpanzee was, however, regarded by the donor Mr. G. WALDAU as an unusually small individual.

² For further comparison may be mentioned that the capacity of a female Chimpanzee skull from Kribi Cameroon is about 373 cc. and that of another also female (possibly *A. vellerosus*) from Ya River, Cameroon, is 360 cc.

area. This variation appears, however, to be independent of locality. It is not impossible that the *Colobus* monkeys living near Rutshuru, in consequence of less favorable alimentary conditions there, constitute a somewhat smaller, less well nourished race than those in the great forest at Beni, but undoubtedly analogous conditions are to be found in other localities as well. The quite young specimen of this collection, mentioned above has already the colour pattern of the adult, although the white mantle fringe is very scantily developed. On the back the under fur is greyish. The length of head and body of this skin is 335 mm.

In spite of the somewhat greater dimensions of the skulls from Beni, as mentioned above, the capacity of the brain-cavity is fully as large in those from Shasha, Rutshuru. The capacity of three male skulls from Beni is resp. 77, 78 and 80 ccm., while the same of two skulls from Rutshuru have this measurement resp. 79 and 81 ccm., thus practically the same.

It might be possible that the subspecies *Colobus occidentalis rutshuricus*, which LORENZ has established¹, might be maintained in consequence of the somewhat smaller dimensions of the skull as mentioned above. The characteristics of the tail, however, which LORENZ quotes do not hold good.

The second race, which LORENZ has named *C. occ. ituricus*², from Mawambi is said to differ from *C. occidentalis* ROCHEBRUNE »durch das Fehlen einer längeren Schwanzquaste». This might partly be individual, partly seasonal. The long hairs of the tuft of the tail may be worn off. Among the males from Beni in the present collection one has the white hairs so much worn that they hardly form any tuft, the others have very well developed tufts.

***Colobus ellioti* DOLLMAN.**

2 ♂♂ (n:o 202 & 203), 1 ♀ (n:o 204), from the forest about two days west of Beni, Aug., Sept. 1914; 2 ♂♂ ad. (n:o 239 & 242), 1 ♂ juv. (n:o 241), from Beni, Jan. 1914.

Dir. LORENZ VON LIBURNAU had received a series of more than 30 specimens of red *Colobi* from the Ituri forest, and on this material he based a species which he named »*Colobus variabilis*» in consequence of its great variability. This took place in the year 1914.³ In the same year Prof. MATSCHIE named a red *Colobus* from Ituri between Irumu and Beni *Piliocolobus ellioti melanochir*. It appears rather possible that the latter is included in the former. Two of the specimens recorded above, n:o 241 & 242, agree with MATSCHIE's *melanochir* with regard to their »Büschel silbergrauer Haare hinter den Ohren» and the whitish grey lower side, but at the same time they agree in some respects with LORENZ's group »d» of *variabilis*, which also is said to have »verlängertes Haar hinter den Ohren silbergrau». The crown of the head behind the black frontal band is »fawn» (DAUTHÉNAY, Rep. de Coul. 308, 3 & 4). The shoulders and upper parts of the arms are a little paler (308, 2 & 1). The nape is darker than the crown, inclining to

¹ Anz. d. K. Akad. d. Wiss. Wien, Jahrg. LI, 1914, p. 508.

² l. c.

³ Anz. d. K. Akad. d. Wiss. Wien, Jahrg. LI, 1914, p. 383.

»madder brown». The upper back is much mixed with black. The middle of the back »reddish black» (344, 3 & 4) on the sacral region fading to smoky blackish which gradually on the thighs and hind legs passes into a colour between »slate» (362) and »smoke grey» (363), but somewhat darker than either. The sides of the head are in the older specimen light grey with a shade of »reddish salmon», in front partly overlaid with blackish hairs. (In the younger specimen the same parts are a pale shade of »fawn».) The throat and the inner side of the arms are smoke grey; the lower side of the body silky whitish grey, inside of hind legs pale grey. Hands and feet smoky black; tail almost pure black.

The third specimen (n:o 239) shot at the same time is partly similar, but darker. The hairs behind the ears are smoke grey. The sides of the head exhibit the palest shade of »dark fawn» (307) mixed with black. The back is »chocolate» (343, 3; or RIDGWAY's: »Prouts brown») overlaid strongly with black in the middle parts, but dominating on the sacral region and from there shading into the somewhat paler (343, 2) hind legs. Hands, feet, and tail black. Lower side of body smoke grey.

One of the males (n:o 202) collected in Aug., Sept. 1914 is rather similar, but the colour of its head, nape and shoulders is more saturated, something between »maroon» (341, 4) and »madder brown» (334, 4). The sides of the head is a pale shade of »burnt umber» (304, 1). The back is »carob brown» (342, 2—4). Otherwise like n:o 239.

The remaining male (n:o 203) is the reddest of all, and most resembling *C. ellioti* DOLLMAN, but differs from the original description of the same by its black hands, and grey, instead of buff, under parts. Head behind black frontal band »madder brown». Nape, shoulders and anterior back »mahogany» (335, 4); on the middle of the back the colour passes into »carob brown» (342, 2) which gradually becomes somewhat paler posteriorly (342, 1) and ends abruptly just above the black tail. Arms almost »Indian chestnut red» (333, 4) dark smoky grey on the inside; hands black. Hind legs »warm sepia» (305, 1); feet black. Lower side of body from the throat backwards rather dark smoke grey, paler on the breast. The hair-tufts behind the ear are dark smoky grey in their lower portion, but blend gradually into the colour of the nape. The sides of the head are something between the palest shades of »madder brown» (334, 1) and »red ochre» (332, 1), only little mixed with black in front. The hairs are also as usual paler (in this case somewhat buffish) towards the tips.

The female (n:o 204) has the crown of the head, behind the narrow black band, »fawn» (308, 2—3). The upper parts of the arms are also »fawn», but a little paler (308, 1—2). The shoulders are much mixed with black, and the whole of the upper side from the upper neck to the tip of the tail is black, perhaps with a reddish shade on the neck. The outer sides of the hind legs is dark smoky blackish grey, darker than RIDGWAY's »fuscous». The inside of the limbs and the lower side of the body are smoke grey, palest on the breast.

These descriptions prove that not two specimens are fully alike.

The question is then to decide, of how great importance these differences are, and whether more than one race is represented by these specimens. It is extremely difficult to have this question settled. It might, however, be assumed that the two

specimens, n:o 241 & 242, which have the palest silvery grey ear tufts, and the lower back smoky blackish without any additional reddish or brownish tint (neither »carob brown», nor »chocolate») might represent a separate race, and that the other ones, in which the ear tufts were darker (»smoke grey»), and in which the reddish or brownish shade of the back extends to the root of the tail, another race. The two first mentioned specimens have also the hind legs without brown.

The red male n:o 203 has, of course, a different and striking appearance, but it seems very difficult to separate it for instance from n:o 202 on account of its colour, only because it is more vividly red.

If thus n:os 241 & 242 should be separated from the rest, the question is not, however, solved. It remains to decide, how they are to be named. It has already been pointed out that they resemble MATSCHIE's *melanochir* with regard to the colour of the ear-tufts. But MATSCHIE stated plainly that his *melanochir* is provided with »karobbenbraunem Rücken», and this does not suit in this case. In a similar way the specimens of all the groups into which LORENZ VON LIBURNAU has divided his »*variabilis*» appear to have more or less reddish or brownish tints on the lower back, and on the hind legs. If the colour presented decisive characteristics, these two specimens could not be referred to »*melanochir*», nor to »*variabilis*».

It is, however, extremely difficult to believe that so many different species and subspecies of red *Colobi* should live in the forest near Beni, and it appears thus most probable that *variabilis* and *melanochir*, and perhaps also *elliotti* and *multicolor* are only colour phases of one and the same species, or perhaps do these names apply to different herds or bands of monkeys. This cannot be satisfactorily elucidated before more material with more exact and more complete information concerning the animals and their mode of life is obtained. Are for instance all individuals of the same sex and age in the same band of these red *Colobi* quite alike? Are all specimens which live in the same tract of the forest similar? Before these questions and some others are answered, it is difficult to decide what is racial difference, or not.

The type locality of *variabilis* is Moera about 20 kilometres north of Beni, as I am told.

The type specimen of *elliotti* was collected much further southwest, viz. »90 kilometres west of the south end of Lake Albert Edward».

MATSCHIE's *melanochir* on the other hand is collected north of Beni, on the way between that place and Irumu.

Finally LORENZ has described a *Colobus multicolor* from Mawambi at Ituri about 140 km. northwest from Beni. This *multicolor* has the sacral region »dunkel schwarzbraun», and the »Schenkel aussen zunächst schwarzbraun, weiter unten lehmfarben». In having these parts without reddish *multicolor* offers some likeness with the above described n:os 241 & 242, but otherwise the difference is great. *C. multicolor* has f. i. the tail reddish brown, the ear-tufts »kastanienbraun, schwarz gerändert» etc.

The skull of the type of *C. elliotti* was lost. LORENZ has not published cranial measurements of »*C. variabilis*» and »*multicolor*». The measurements, which are recorded below, of the skulls of the four adult male skulls of this collection agree on the whole quite well

as well inter se as with those of *melanochir* which MATSCHIE has published. The skull of the reddest specimen (n:o 203) is the largest (Pl. VI, fig. 5), but in is also the oldest with *sutura coronalis* obliterated. — All four specimens are fully adult with well developed *crista sagittalis* and long canines. With this skull the type skull of *melanochir* agrees in total and basal length as well as in several other respects except zygomatic breadth, in which respect *melanochir* more resembles the smaller specimens of this collection. The skull dimensions do not support any hypothese about racial difference.

	♂ N:o 242	♂ N:o 239	♂ N:o 202	♂ N:o 203
Greatest length of skull	112 mm.	107,5 mm.	109 mm.	115 mm.
Condylø-basal length	88,3 »	85,5 »	88 »	90 »
Basal length	77 »	77 »	77 »	79,3 »
Zygomatic breadth	80,7 »	83,5 »	82,3 »	90,4 »
Breadth of brain-case	56 »	56,3 »	58,2 »	60,5 »
Least interorbital width	11,1 »	10,2 »	11 »	12,2 »
Width of skull across <i>meatus auditorius</i> . .	61,6 »	63,2 »	63,3 »	65,2 »
» » <i>planum nuchale</i>	64,6 »	65,1 »	65,6 »	66,2 »
Breadth across outside of m^1	33 »	33,5 »	32,5 »	35 »
Length of upper molar series	30 »	29,6 »	30 »	29,5 »
Palate length to tip of spine	39,2 »	40,2 »	40 »	44 »
Brain capacity	70 ccm.	69 ccm.	80 ccm.	80 ccm.

The difference in brain capacity between these specimens is comparatively very great.

The anterior root of the zygoma is in all situated above the anterior half of m^2 (Pl. VI, fig. 5), even in the young male. The latter is just getting its first permanent premolars, which are cutting the gum. Its dp^2 are still in place, but are in the act of being pushed away by p^2 , the crown of which is already visible. The small milk-canines are still in place. The last molar is just below the gum in both jaws. In the lower jaw none of the milk premolars has fallen out as yet.

It is very remarkable that the capacity of the brain cavity of this young animal is about 88 ccm., thus more than the maximum of the adult males. It may also be remembered that this young male is to judge from the colour of the skin most nearly related to the male n:o 242, which has a comparatively small brain.

Since the above already was put in print I have had the pleasure of receiving a letter from my friend Director LORENZ VON LIBURNAU in which he kindly communicates that since he has received still more material from Beni, Mawambi, Moera etc., he is convinced that *Colobus variabilis* is identical with *C. ellioti*, and that this also is the case with *C. melanochir*.

This is thus fully in accordance with the opinion which I have expressed above.

The extremely great variability of these red *Colobi*, as set forth in LORENZ's paper as well as in this one, and the fact that *Colobus ellioti* was described on insufficient

material, has caused the confusion, which now, as it may be hoped, is removed. On the other hand, however, this great variation is of deep interest, and it ought to be considered in connection with several other striking proofs of variation which are elucidated in this paper.

Cercopithecus schmidtii enkamer MATSCHIE.

1 ♂, 2 ♀♀ from Rutshuru, ²⁵/₉ 1913; 2 ♂♂, 2 ♀♀ *ibid.*, ²⁸/₉ 1913; 2 ♂♂ *ibid.*, ¹⁴/₁ 1914; ♂ ♀ from the forest at Masisi in the Kivu district, Febr. 1914; 1 ♀ from Beni, Aug. Sept., 1914.

All these specimens show the characteristics by which according to MATSCHIE the subspecies *enkamer* differs from the typical *schmidtii*, viz. — — »die Aussenseite der Unterschenkel hell bestäubt, der Schwanz auch dicht über dem Anus tief grau» — — —. Only one of the specimens from Rutshuru has the basal under parts of the tail light grey as shall be the case in *C. schmidtii sassae* MATSCHIE (viz. ♀ n:o 22). As this specimen has been shot the same day as other specimens with normal colour at the root of the tail this may be only an individual aberration. The colour of the specimens of this collection is on the whole essentially alike, although presenting variation. The male (but not the female) from Masisi has very long black tips of the hairs of the upper parts of the head, so that the crown looks almost black when the hairs are laid down. It is uncertain, however, if this is more than an individual variation. The same is probably also the best interpretation of the fact that this specimen has a brighter shade of yellow in the rings on the hairs of the crown than the other ones, even than the female from the same place. These rings are somewhat different in shade in the different specimens perhaps palest in the female from Beni.

There are still some other differences in shades of colour, but they appear to be individual as well. The light sprinkling on the arms is somewhat more or less pronounced in different specimens from the same locality and of the same sex. The darkest hind legs with least sprinkling are found in the male from Masisi and the female from Beni, thus in those from the most distant localities, but some of the other specimens are almost as dark.

The colour of the tail is rather variable; in some instances it may perhaps have faded. Often the tail of the females as well as also the same of several males is »fawn» (DAUTHÉNAY: Rép. de Coul. 308) with a lighter shade of this colour below and on the sides darker above. Some males have the tail bright rust-red (Rép. 318, 1 & 2). The female from Beni has the darkest red tail resembling a light shade of »mahogany» (335) on the sides and almost »madder brown» (334) above. In some of the females from Rutshuru the tail is more dusky above than in other specimens, but I am inclined to regard all these variations in colour as wholly individual.

In the year 1914 LORENZ VON LIBURNAU named some Guenons from »Wabembe im Nordwesten des Tanganyikasees» »*Lasyopyga schmidtii montana*».¹ The distinguishing characteristics of this supposed new race should consist in the following: »Behaarung

¹ Anz. d. K. Akad. d. Wiss. Wien 1914 Jahrg. LI, p. 357.

an der Innenseite und an dem Rande der Ohren nicht weiss, sondern rötlich-ocker; Schwanz an der Unterseite ohne Weiss.» A single specimen from Rutshuru is said to hardly differ from those from Wabembe. If the present specimens are examined with regard to the colour of the hairs on the ear the following is found. One of the males from Rutshuru has a rather pale »reddish-ochre» tint on the tips of the hairs of the inside of the ear. In another male the same may be traced. In one of the females a similar condition is found, but in a still paler shade. In the male from Masisi the tips of these hairs are slightly stained in a similar way, but in the female it is hardly discernible. In the other specimens the hairs in question are white or whitish. This characteristic appears thus to be subjected to variation and is not alone sufficient for distinguishing a subspecies.

Other specimens from the Ituri forest at Beni and Mawambi the author just quoted has named »*Lasyopyga schmidtii ituriensis*». As, however, MATSCHIE's subspecies *Cerco-pithecus schmidtii enkamer* has been collected at the same locality, »*ituriensis*» and »*enkamer*» without doubt are identical. As MATSCHIE has given his name two years previously,¹ it must have priority before the other. The name *ituriensis* must thus give place to *enkamer*. It remains, however, to decide whether LORENZ's subspecies *montanus*, can be maintained, or with other words if the specimens from Rutshuru are racially distinct from such ones from Beni. As the present collection only contains one specimen from the latter locality it is very difficult to express any decisive opinion in this matter. The only conspicuous difference between the present Beni specimen and the other ones is the above mentioned aberrant colour of the tail. It is, however, uncertain, whether such a difference in colour of this organ is constant, or not, the more so as the colour of the tail is very variable in specimens from Rutshuru, although none of them has just this colour. The variability of the colour of these Guenons in other respects as well has been set forth above as f. i. with regard to the hairs on the ears, the hind legs, the shade of the yellow rings on the hairs of the crown etc. It appears therefore difficult to base a subspecies on the characteristic mentioned when the variation in colour is so common.

LORENZ found the fur of the specimens from Wabembe $\frac{1}{2}$ to 1 cm. longer than that of the Ituri specimens. In the present male specimens from Rutshuru the fur is longer than in the male from Masisi, but in the females from these localities it is about as long as in the female from Beni, or about 4 cm. in all females.

It is, however, not only the shades of colour which vary among these animals. The same is the case with the dimensions of the skulls as the following table of measurements proves, although in reality the differences are much more apparent to the eye at a direct comparison of the skulls (Pl. VIII) than the figures of the table show. A comparison of the general dimensions of these skulls with those recorded by MATSCHIE (l. c. p. 30) for his original specimens of *enkamer* prove, that the latter lie within the limits of variation expressed below.

It is of interest to note, that the large male n:o 23 (Pl. VIII, figs 1 a & 2 a) has been shot the same day, ²⁸/₉ 1913, as the small male n:o 25 (Pl. VIII, figs. 1 b & 2 b) and the

¹ Ann. de la Soc. r. Zoologique et Malacologique de Belgique, Tome XLVII (1912), p. 29.

two small females, n:o 22 & n:o 24. These specimens may thus have been shot out of the same band, but certainly in the same tract.

	Masisi	R u t s h u r u					
	♂ (N:o 100)	♂ (N:o 23)	♂ (N:o 25)	♀ (N:o 17)	♀ (N:o 19)	♀ (N:o 22) ¹	♀ (N:o 24)
Total length of skull	94,8 mm.	99 mm.	92 mm.	95 mm.	98,7 mm.	92 mm.	81,5 mm.
Condylbasal length of skull	74,5 »	79 »	71,7 »	74,5 »	79 »	69,5 »	61,4 »
Zygomatic width	64,6 »	64 »	61,8 »	62 »	65 »	61,2 »	55,5 »
Breadth across m^1	31 »	29,8 »	30 »	31,5 »	29,5 »	27,7 »	26,5 »
Length of upper molar series	21,6 »	23,7 »	21 »	24 »	25,2 »	20 »	19,6 »
Greatest transverse diameter of m^2 . . .	5,1 »	5,7 »	5,5 »	5,5 »	5,7 »	5 »	4,7 »
Palatal length from gnathion to hind margin of lateral incisure	29,5 »	34 »	32 »	37,7 »	34,7 »	29 »	25,8 »
Capacity of the brain-cavity	about 56 ccm.	60 ccm.	55 ccm.	61,5 ccm.	58 ccm.	60 ccm.	51 ccm.

The dimensions of the brain-case of this species proves thus to be of about the same size in some females as in the males, contrary to the usual condition among the Guenons. Compared with the other considerably larger species this one seems to have a big brain. The shape and size of the orbits and of the nasal aperture is very variable as can be seen on comparing figs. 2 *a* & *b*, and figs. 4 *a* & *b* of Pl. VIII.

The smaller males have also a shorter molar series than the larger females. The shortness of the molar series of some specimens appears sometimes to depend more upon the smallness of the premolars than that of the molars. Thus in the male n:o 25 the true molars measure 15,2 mm. and those of the male n:o 23 15,6 mm. In other cases all the teeth are diminished in size, f. i. the female n:o 24 (Pl. VIII, fig. 5 *b*) has the series of true molars only measuring 13,5 mm., while the same measurement of the female n:o 19 (Pl. VIII, fig. 5 *a*) is 17,7 mm. But the female n:o 24 ought probably to be regarded as a dwarfed specimen.

The degree of prognathousness is also rather variable in these skulls, and some of them have a much more steep profile (cf. Pl. VIII, fig. 1 *a* & *b* and fig. 3 *a* & *b*) than some others. The anterior root of the zygoma is usually situated opposite the middle of m^2 , but in the female n:o 17 it is placed further back above the posterior end of m^2 .

It must also be stated that the variations in colour mentioned above do not stand in correlation to the characteristics of the skull. It is true that the small-headed and small-toothed female n:o 22 has the root of the tail rather light grey below, and that the male n:o 25 are lighter at the same place than the male n:o 23, and that the former has smaller head than the latter. But the female n:o 24 which has the smallest head and smallest teeth, has the tail as dark below as any of the large-headed specimens. In a similar way the big-toothed male n:o 23 and ditto female n:o 19 have a slight reddish tint to the hairs in the ear, but the same shade of colour is in the corresponding place better developed in the small-toothed male n:o 18 (upper molar series 21,3 mm.), and in all other specimens this shade is absent, if the skulls are small or large.

¹ Very old, teeth much worn.

As a conclusion from this it might be suggested that MATSCHIE's *Cercopithecus schmidti sasse*, which has been established on only one female specimen, may be a somewhat aberrant specimen of the same kind as *enkamer*. The type of *C. s. sasse* appears to have cranial dimensions very nearly agreeing with those of the female n:o 24 of this collection (cf. above).

Cercopithecus pygerythrus centralis NEUMANN.

1 ♂ ad., 1 ♂ juv. $\frac{5}{10}$ 1913, Rutshuru; ♂, ♀ ad. $\frac{7}{1}$ 1913, ibid.; 1 ♂ ad. $\frac{7}{10}$, ibid.

This race is generally less brightly coloured than its East African allies, and the black on the chin and around the corners of the mouth somewhat more broadly developed. Head and neck are usually darker than the back, and the black is in most cases (only one exception among these 5 specimens) dominating over the buff rings. It appears thus less suitable when ELLIOT begins his description with the expression: »Top of head buff.» The hands become black at an early age, at least in the males, already when the first molar is developed. In the same stage the feet of the male are only spotted with black, and in the adult females they are, even when the teeth have become pretty well worn, tinged with blackish brown, but in the adult males the feet are quite black. The colours of the female are generally duller than those of the male. The colour of the tail is variable. Often it is much mixed with black on the upper side, especially towards the end; in other cases it is rather pale even at the end. The rufous at the root of the tail and on the scrotal tract is well developed even in the young male, but in one of the adult males it is hardly visible at the latter place. In the adult female the rufous is seen as well at the root of the tail as below the callosities.

	♂ ad.	♂ ad.	♂ ad.	♀ ad.
Total length of skull	99 mm.	104,5 mm.	104 mm.	91,4 mm.
Occipitonasal length	86 »	90 »	86,5 »	81,2 »
Basal length	71 »	70 »	73 »	62,8 »
Zygomatic width	—	74 »	70 »	—
Least postorbital width	42,8 »	44,5 »	43,3 »	40,3 »
Width of brain case	54,3 »	56 »	56 »	—
Length of nasals	15,2 »	16 »	15 »	14 »
Upper molar series	26,2 »	24,6 »	25,2 »	20,6 »

The capacity of the brain-cavity is about 68 ccm. in an adult male, but in a young male with only first molar developed about 50 ccm.

C. p. centralis takes in the Central Lake district undoubtedly the same biological place as the »Tumbili» monkeys in East Africa inhabiting dry forests, acacia-groves, gallery forests at the rivers of the steppe country etc.

Cercopithecus leucampyx schubotzi MATSCHIE.

♂ ♀ $18/9$, ♂ ad., ♀ semiad. $8/12$ 1913, Rutshuru; ♂ pull., ♀ juv., Beni, Aug., Sept. 1914; 1 ♂ old, ibid. Dec. 1914.

This race is, of course, very nearly related to *C. l. carruthersi* Pocock, but the latter is said to be »darker» on the belly than on the back, and that is not the case with the present specimens. On the other hand the adult males differ somewhat from MATSCHIE's description of *C. l. schubotzi* when the author quoted says — — — »die Gegend zwischen den Schultern nicht wesentlich dunkler — — — als der Rücken» — — —, for in the present specimens of adult males the area between the shoulders is black, sparingly ringed with whitish, thus darker than the back. In this respect, they resemble ELLIOT's »*Lasiopyga princeps*», but differ again from that one by the colour of the hind legs, which is only little darker than that of the back. In *Cercopithecus princeps* the thighs are said to be black »faintly speckled with white», and the legs beneath the knees only »very slightly so». *C. princeps* is also said to have the area between the shoulders »jet black».¹

The black band across the chest is more or less ticked with whitish rings in the adult males of the present collection; in the females it is blackish grey. The black of the distal portion of the tail has greater extension in the adult males than in the females and young.

The specimens from Beni and Rutshuru are similar in colour.

The old male from Beni with much worn teeth has the largest skull with a greatest length of 115,5 mm. The corresponding dimension of the two male skulls from Rutshuru is resp. 108,7 and 109 mm. Both are fully adult, but the molars are not yet much worn. The zygomatic breadth is resp. 75,7, 74,5 and 72 mm.; length of upper molar series resp. 28,3, 26,8, and 26,7 mm.

The capacity of the brain-cavity is about 70 ccm. in one, only about 67 ccm. in another adult male. In a quite young male with milk-dentition it is about 52 ccm.

This dark monkey appears to play biologically the same parts in the dense and ever-green forests of the Central Lake-district as the »Kima»-monkeys, i. e. the various races of the *albigularis*-group do in East Africa.

Cercopithecus kandti MATSCHIE.

1 ♂ $30/6$; ♀ 1914, Kisenji, German East Africa.

These two specimens Capt. ARRHENIUS received as a present from a German officer.

The female is fully as, or perhaps still more brightly coloured than the male. Especially is to be noted that the deep red of the anal region extends more over the basal portion of the tail in the female than in the male.

¹ The three mentioned races termed *carruthersi*, *princeps* and *schubotzi* are very nearly related, and it appears uncertain whether they can be distinguished by constant characteristics, if a great material was compared.

As the skull of this species appears to be undescribed, the type being a skin without skull, the following measurements of a fully adult, but not very old (parietal sutures still open) male skull are communicated.

Greatest length	117,3 mm.
Occipitonasal length	97,8 »
Basal length	88 »
Zygomatic breadth	78,6 »
Breadth of brain-case	59,3 »
Least postorbital width	42,5 »
Interorbital width	7,7 »
Breadth across middle of orbits	60 »
Length of nasals mesially	20,5 »
Palatal length	40 »
Greatest breadth of <i>planum nuchale</i>	60,6 »
Length of upper molar series	28,5 »
» » lower » »	33,5 »
» » upper canine	21 »

The capacity of the brain-cavity of this skull is about 76 ccm.

Cercocebus (Lophocebus).

This group is characterized by its crested head and long hair, but when ELLIOT in his monograph (Vol. II, p. 266) adds »zygomatic arch (jugal), below alveolar border of molars» this is evidently a characteristic which only holds good at most for some of the members of the group as already pointed out by SCHWARZ 1910.

Cercocebus (Lophocebus) albigena ituricus¹ MATSCHIE.

7 specimens, viz. 1 old ♂, 2 adult ♀♀, a young ♂ and 1 young ♀ from Beni, Jan. 1914, and an adult ♀ and a young ♂ from Rutshuru, ¹²/₁₂ 1913.

A member of the *albigena*-group with quite short-haired cheeks, a strongly developed brow-fringe and a large occipital tuft or crest.

In the old ♂ the general colour of body, head, limbs, feet and tail is jet black with the following exceptions. The short and sparsely set hairs on the sides of the head and on the throat are light or whitish grey (but the chin is black). The long and soft hair behind the ears, on the nape behind the parieto-occipital crest (which itself consists of black hair of normal texture), on the hind neck, and over the shoulders (where it is less soft and wooly) has a general colour which is most similar to »warm sepia» (DAUTHÉNAY: 305, 2). Towards the tips of the soft tufts behind the ears the colour fades to a paler tint, almost similar to »otter-brown» (DAUTHÉNAY: 354, 4). Some of the long hairs

¹ This species has in Zoological Record for 1913 erroneously been recorded under *Colobus*(!) and may thus easily be overlooked.

above the shoulders are provided with whitish rings 2—3 mm. in breadth, but with broader dark interspaces. These rings are too few to produce a real grizzled appearance.

The length of the hairs of the brow-fringe is 5—6,5 cm. The length of the hairs of the parieto-occipital crest is 5—7 cm., the longest hair being found on the occiput. The tufts behind the ears, and the long soft hairs on the neck attain a length of about 10 cm. The black hair of the upper back is generally 8 cm., but individual hairs reach a length of 13 cm., or even more.

The colour of the females is similar, but the »warm sepia» is somewhat paler on the long soft hairs at the ears, hind neck etc. The white rings on the hairs at the shoulders are still fewer than in the male and are entirely absent in one of the females from the Beni forest. In two of the females the colour of the lower side tends to assume a »reddish black» (DAUTHÉNAY: 344, 2) colour, or a dark shade of »warm sepia», and in some of them there is a slight tint of this colour on the thighs as well.

The three immature specimens are similar to the females. They have no light rings on the hairs at the shoulders.

The hairs of the females are partly less long than the corresponding ones of the male. The brow-fringe is about 5—6 cm. The tufts at the ears, and the long soft mane on the hind neck are less developed.

The colour of these specimens agrees with that of MATSCHIE's *Cercocebus albigena ituricus*, which appears to be the darkest of the known races of the *albigena*-group with the exception of LYDEKKER's *johnstoni* which originally was said to be entirely black, or, as ELLIOT adds¹ about the type (a young animal), »shoulders and under parts tinged with red». Afterwards it has been believed that the fullgrown *C. a. johnstoni* should have mane and a short mantle of a brownish tint, which ELLIOT terms »Prout's brown with a purplish tinge». Such a colour description does not in any case suit the present specimens. Besides MATSCHIE² has proved that his *ituricus* in no stage is entirely black, and this is confirmed by the conformity in colouration of the present specimens. The author just quoted has also pointed out that when reviewing the races of *Cercocebus* belonging to this group SCHWARZ has confused at least two different forms under the name of *johnstoni* viz. the Uganda Mangabey, which has a chocolate coloured mane and is smaller in size, and the Ituri form which is larger. MATSCHIE has named the former *C. a. ugandæ*, the latter *C. a. ituricus*.

With regard to the characteristics of the skull (cf. Pl. XII, fig. 1 & 2) there appears to be some confusion yet. When describing the skull of »*C. a. johnstoni*» SCHWARZ writes³ as follows: »Der untere Rand des Jochbogens liegt meist etwa in gleicher Höhe mit dem Alveolarrande». ELLIOT in his »Monograph» has gone so far as to declare⁴ as a characteristic of the whole subgenus »zygomatic arch (jugal), below alveolar border of molars». He does not appear to have observed that this statement stands in opposition to a quotation from SCHWARZ concerning *Cercocebus albigena zenkeri* which he renders a couple of

¹ Review of Primates II, p. 268.

² Rev. Zool. Afric. 1913, p. 208—210.

³ Sitz.ber. Ges. Naturforsch. Freunde, Berlin 1910.

⁴ l. c. II p. 266.

pages¹ further below, viz: »Der untere Rand des Joehbogens erscheint in der Seitenansicht etwa in der Höhe der Zahnwurzel der Molaren» — —.

In all the present seven specimens the lower margin of the zygomatic arch is well above the alveolar margin of the molars, the distance varying from 9—10 mm. in the adult (Pl. XII, fig. 1) to 6 mm. in some immature specimens.

As MATSCHIE had not mentioned anything about this in his description of *C. a. ituricus* I took the liberty of writing to him and asked about the condition of the zygomatic arch in the Ituri race. He kindly replied that it was as in other members of *Cercocebus* »6—10 mm. über der Höhe des Alveolarrandes». This question is thus settled, and in this respect the present specimens agree with the types.

The dimensions of some skulls in this collection are recorded below.

The upper molar series of this Mangabey is lighty and evenly arched as in »*C. a. johnstoni*» unlike *C. a. zenkeri* fide SCHWARZ. The palatal roof is also shaped about in the same way as SCHWARZ has described that of »*C. a. johnstoni*» viz. »im Querschnitt fast rechteckig mit dem Knick am oberen Wurzelende der Molaren».

	♂ old, Beni	♀, Rutshuru	♀ old, Beni
Greatest length of skull	126,6 mm.	115 mm.	116,5 mm.
Basal length of skull	95,5 »	76 »	—
Condylbasal length of skull	101 »	84 »	95 »
Nasion—gnathion	57 »	47 »	53 »
Nasion—inion	90 »	79 »	84 »
Palate length	53 (49,6) »	—	48 (43,5) »
Palate breadth inside canines	21 »	20 »	20 »
Length of nasals	30 »	21,5 »	21 » ²
Breadth of nasals	9,3 »	7 »	—
Zygomatic (greatest) width	82,6 »	71 »	75,5 »
Least postorbital width	47 »	43 »	42,9 »
Breadth across the orbits	66,8 »	56 »	62 »
Width of brain-case	63,3 »	61 »	58,5 »
Mastoid breadth	71,8 »	62 »	65 »
Breadth across canines	34 »	29,5 »	32,4 »
Back of m^3 to front of c (alveolar)	37,1 »	35 »	37,4 »
Back of m_3 to front of c (alveolar)	40,6 »	39 »	41,2 »
Length of upper molars only	29 »	29,5 »	28,5 »
Greatest transverse diameter of m^2	7 »	6,6 »	6,2 » ³
Length of m_2	7,5 »	7,1 »	7,2 »
Length of m_3	7,8 »	8 »	8 »
Gnathion to hind margin of jugale	53,6 »	43 »	52,6 »

} another
♀ with
unworn
teeth

¹ l. c. p. 269.

² In another female 24,5 mm.

³ In a young but adult female this diameter of the unworn tooth is 6,9 mm.

***Papio tessellatus* ELLIOT.**

1 ♂ ad., 1 ♂ semiad., 1 ♂ juv. $\frac{5}{8}$; 1 ♀ ad. $\frac{8}{8}$; 1 ♀ ad. $\frac{16}{9}$; 1 ♂ pull. $\frac{7}{8}$ 1913, Rutshuru; 1 ♂ ad. killed in a forest near Rutshuru $\frac{25}{2}$ 1914; 1 ♂ ad. killed in »forêt et montagne Kabwe, Rutshuru $\frac{29}{3}$ 1914.

Named »Kabula» in kiswahili.

The Baboons which constitute this very interesting and valuable series have been collected not very far from the type locality (Mulema, Nkole, Uganda) of *Papio tessellatus* (!) ELLIOT. This Baboon has later been stated from Kagera as well, according to HECK.¹ It could therefore be expected that the Baboons of Rutshuru should belong to this race. The cranial measurements of ELLIOT's type (»a very large animal») agree quite well with the corresponding ones of the adult males in this collection as the accompanying table of measurements indicates, but the colour of the Nkole Baboon as described by ELLIOT differs from that of the present specimens to some degree. He says: »Hairs throughout on head, neck and body seal brown, with a broad subterminal band of a darkish cream color and tips black». This description suits the female and semiadult specimens of this series with the exception that the colour of the subterminal rings of the hairs on the hind quarters exhibit a brighter shade than »cream» and approach more to »ochraceous buff» of RIDGWAY's nomenclature. This is still more the case with regard to the males in which only the rings on the head and neck might be termed »darkish cream coloured», but on the back and hind quarters the corresponding parts tend more to »ochraceous buff» or even »antimony yellow». On the outer side of the arms and legs the colour of the pale rings dominates. The hands and feet of the adult males are black with some sprinkling of the light rings visible. In the females and young males the hands are black, in the former somewhat mixed with brownish. The feet of the young males are mixed brownish black and »buffy brown», and those of the females still paler as they also are more or less mixed with the colour of the legs derived from the pale rings of the hairs.

The quite young animal, which is the palest of all, has the hands blotched with black, but the feet only dark brown at the toes.

The »cheekered appearance», about which ELLIOT speaks, is less visible in the old males than in the females. In the latter and in the young males the black tips to the hairs also form black blotches on the crown of the head.

The tail of this Baboon is rather short measuring in an adult male 41,5 cm. without hair, or with the hairs 49 cm. In the adult female it is only 31,5 cm. with the about 3 cm. long hairs at the tip.

The above mentioned differences in colour between these adult specimens and ELLIOT's type of *P. tessellatus* are probably due to the latter having the originally ochraceous and yellow rings faded.

In the adult male skulls from Rutshuru the nasals are as ELLIOT describes them in the type: »rounded and raised above the plane of the rostrum (Pl. VII, fig. 4). The

¹ BREHM's Tierleben, Säugetiere, Bd. IV.

small process on the frontal ridge over each orbit near end of nasals», about which the author quoted speaks, is also present, but it is nothing characteristic to this race of Baboons, nor to Baboons as for instance a similar process can be seen in *Cercocebus* skulls as well (cf. Pl. XII, fig. 2).

	♂ ad.	♂ semiad. ¹	♂ juv. ²	♂ pull. ³	♀ ad.	♂ ad. ⁴
Total length	216 mm.	171 mm.	143,6 mm.	117,3 mm.	164,5 mm.	210 mm.
Occipitonasal length mesially	175 »	141 »	123 »	107,4 »	137,5 »	172 »
Basal length	155 »	119 »	92,6 »	66 »	111 »	154 »
Zygomatic width	129 »	101 »	90 »	74,3 »	100 »	121 »
Palatal length (inside between median incisors)	99 »	73 »	55 »	38 »	70 »	95 »
Breadth of brain-case	81 »	83 »	74,5 »	71,6 »	78 »	85,5 »
Least postorbital width	58 »	59,5 »	54,7 »	53,6 »	59 »	57,7 »
Interorbital width	14 »	8 »	6,8 »	4,7 »	9,3 »	11,9 »
Length of nasals mesially	73 »	53 »	38,3 »	33,3 »	59 »	72 »
Width of snout across first premolar	57,5 »	45 »	40,6 »	32,2 »	40,4 »	52 »
Distance from mesial point of superciliary ridge to tip of premaxillary	135 »	102 »	74,8 »	61 »	106,6 »	133,5 »
Distance from the same point as above and the occiput (without crest)	105 »	104 »	97 »	90 »	101 »	106 »
Distance between outer brims of the orbital walls on a level with the middle of the orbit	95 »	74,5 »	67,5 »	53,3 »	74,3 »	91 »
Distance from lower border of orbit to mesial tip of nasals	67,3 »	43 »	29 »	21 »	46,3 »	65 »
Width of upper surface of muzzle halfway between orbits and tip of nasals	45 »	41 »	33 »	23,8 »	34 »	41 »
Width of palate between last molars	31 »	—	—	—	25 »	29,5 »
Length of upper molar series	53 »	—	—	—	49 »	54,6 »
Length of lower molar series	62 »	—	—	—	56 »	—

The nasals of the females and the young animals are anteriorly flat and not raised. (cf. Pl. VII). In the females the lateral parts of the snout are not swollen, nor forming elevated ridges. In the males on the other hand this masculine characteristic begins to show at a very early period. Already in the quite young male with only milk-dentition a swelling or inflation is apparent in the upper anterior portion of the maxillary (Pl. VII, fig. 1). In the young male with the first molar developed this inflation is still larger, but it is yet evenly rounded off (Pl. VII, fig. 2). In the semiadult with the second molar developed the swellings are already very large (Pl. VII, fig. 3); there is a deep and broad pit on the sides of the maxillary above the roots of the molars, and the upper surface of the rostrum displays longitudinal grooves between the elevated nasals and the lateral swellings. The latter have, however, still a smooth surface and are broadly rounded off on the sides. Finally in the adult (Pl. VII, fig. 4) the rostrum gets its definite shape; the

¹ Last molar not yet visible, *c* not much higher than first premolar.

² Only first molar developed, *dc* present.

³ Only milk-dentition.

⁴ From Hoima, Uganda.

nasals form a median rounded ridge, on either side bordered by a broad shallow groove, on the outside of which the now compact lateral ridges rise as a crowning of the vertical side walls of the maxillary. The whole upper surface of the snout ridges has gotten an uneven and rugged appearance, and the compactness of the bones indicates their value as protective armature.

The nasals are very different in shape at different ages. In the young animal with only milk-dentition the anterior portion of the nasals, which already are fully aneelyosed without any visible mesial suture, is broadly triangular measuring 11 mm. in breadth at the nasal opening, or not much less than in the old male. This triangular portion has about the same length as breadth, but the nasals are then produced backwards as very narrow linear strips of bone, only measuring about 2 mm. together in the interorbital region. These posterior narrow parts of the nasals are not yet ossified but show an open mesial suture. This suture has already disappeared in the next stage with the first molar developed. At the same time the shape has altered so that the nasals do not any longer form a broad anterior triangle with a narrow posterior shaft, but they taper more gradually backwards, because the middle and posterior portions have grown somewhat in breadth. The development of these bones has continued in the same direction in the next stage with the second molar developed. In the fully adult male the greatest anterior breadth of the nasals is 13,8 mm. and 28 mm. from the anterior end it is still 12 mm. On a level with the centre of the orbit it is 6,4 mm. These measurements compared with those indicating the length of these bones, and which are recorded in the table above, show the gradual transformation of the nasals. With the increasing breadth of the posterior parts of the nasals they are also thickened, and at the same time rising above the surrounding bones. It has already been stated that the nasals of the female are flat. In their general outline they resemble those of the semiadult male with the second molar developed.

With regard to the development of the skull at the different ages represented it can be concluded from several of the series of measurements in the table that it is chiefly the facial portion which grows, while the brain-case increases less in size (cf. Pl. VII). The breadth of the brain-case of the young male with milk-dentition is already fully 88 % of that of the adult male. In a similar way there is only a difference of about 4 mm. between the least postorbital width of the young with milk-dentition and that of the adult male. The length of the brain-case is not so easy to measure exactly, but if this is attempted by taking the distance from the mesial point of the supereiliary ridge to the occiput (not counting the occipital crest of the adult) we find that this dimension of the young with milk-dentition represents nearly 77 % of the whole length of the skull, and it is 85,7 % of the length of the brain-case of the adult male, which in the same measures less than half the total length of the skull. If the skull with the first molar developed is compared in this respect with the adult, we find that the corresponding percentage is not less than 92,3 %. To fully estimate this it must be remembered that the total length of the skull of the young animal with milk-dentition is only 56,9 % of that of the adult, and the total length of the skull with the first molar developed is 66,4 % of the adult.

Quite opposite relative conditions are found if such measurements as express the

dimensions of the facial portion of the skull are compared. Thus the palatal length of the young with milk-dentition is less than a third of the length of the whole skull, and only 38,3 % of the corresponding palatal measurement of the adult. In the skull with the first molar developed the rostral portion has increased so much that the palatal length is contained only $2\frac{3}{5}$ times in the length of the skull, and if compared with the palatal length of the adult the percentage is 55,5 %. In the semiadult skull with the second molar developed the palatal length is contained about $2\frac{1}{3}$ times in the length of the skull, and it represents 73,7 % of the palatal length of the adult. The rostral portion of the skull thus increases in length *pari passu* with the development of the dentition. From the beginning the general shape of the skull of the young Baboon with milk-dentition is very similar to that of f. i. an adult *Cercocebus*-skull. It is first with the fuller development of the permanent dentition that it becomes »dog-faced».

This development of the dog-like shape of the skull appears to increase most rapidly at the age when the second molar grows up. This can be found by comparing fig. 2 and fig. 3 of Pl. VII and by the following relative measurements. The length of the face, measured from the mesial point of the superciliary ridge to the tip of the premaxillary, is in the young Baboon with milk-dentition only 52 % of the total length of the skull, and in the young Baboon with the first molar fully developed the relation is the same, viz. up to that time the different portions of the skull have grown in practically the same proportions. In the semiadult Baboon again with the second molar developed the length of the face measured as above is not less than 59,6 % of the total length of the skull, and in the adult it is 62 %.

The final modelling of the male skull follows first after the development of second molar at the same time as the canines attain their full size, the third molars develop, and the animal reaches maturity. With the development of the dentition the musculature of the jaws increases very strongly which in a high degree influences the bones. The zygomatic arches are widened and strengthened (cf. Pl. VII, fig. 3 & 4), and at the same time also the walls of the orbit etc. The interorbital wall grows to almost the double thickness. The preorbital portion of the nasals increases with about 50 percent as compared with the semiadult, and so on, which all can be concluded from the recorded measurements.

The skull of the adult female (Pl. VII, fig. 5) is in general shape rather similar to that of the semiadult male (Pl. VII, fig. 3) with the second molar developed, in spite of the fact that the snout of the female is narrower and has no swollen lateral ridges etc. as the male. This likeness is probably due to an analogous development of the musculature of the jaws in the female and the semiadult male. The female has no very large canines, and those of the male in the stage mentioned have not yet developed to greater size than those of the female. The armature of both is thus similar and much less powerful than that of the adult male. The zygomatic width is therefore almost alike, the same is still more the case with the width across the middle of the orbit. The difference in palatal length is only 3 mm. in favour of the semiadult male. The length of the face from the mesial point of the supraorbital ridge to the tip of the premaxillary is only about 4 mm. longer in the adult female than in the semiadult male.

The dimensions of the brain-case of the female as expressed by the measurements of the greatest width, the least postorbital width and the distance between the supra-orbital ridge and the occiput (without crest) are very similar to those of the adult and semiadult males, although the latter are a little greater than those of the female.

The capacity of the brain cavity is in the young Baboon with milk-dentition about . . .	144 ccm.
The same of the young male with first molar developed is about	155 »
The same of the semiadult male with second molar developed is about	185 »
The same of the adult male is about	185 »
The same of the adult female is about	172 »

Judging from external measurements of the skull it is rather surprising to find that it is so much difference in volume between the brain-cavity of the adult male and that of the female. It appears probably that this is due to the male brain-cavity being wider behind in its occipital portion than that of the female. To prove this with exact measurements is difficult without cutting the skulls, and this material is too precious for that. As it has been stated above the adult female and the semiadult male (with second molar developed) skulls represent in several respects the same morphological stage because the latter has not yet attained the great massiveness of the bones found in the adult male. It may therefore be assumed that in both the breadth of the squama occipitalis stands in the same relationship to the width of respective brain-cavities the wall of which it forms. As the greatest breadth of the planum nuchale in the female skull is 74 mm., and that of the semiadult male is 85 mm., it may be concluded that the posterior portion of the male brain-cavity is in a corresponding degree wider than that of the female. This may be the explanation of the difference in volume of the brain-cavities as recorded above.

With regard to the stages of development of the dentition of the young Baboons of this collection the following communications can be made. In the youngest skull only the complete milk-dentition is present.

In the next youngest skull, characterized by the presence of the first molars, the permanent upper incisors are present, but the lateral pair has not attained full height. In the lower jaw the median pair of permanent incisors have attained full size, but the lateral pair are cutting the gum. The milk-canines and milk-molars are present in both jaws.

In the semiadult skull with the second molars developed no milk teeth are left; the permanent incisors and premolars are fully developed, but the canines of the lower jaw have not quite reached the height of the first premolar; and those of the upper jaw are still shorter.

Papio tessellatus ELLIOT is of course nothing more than a geographical subspecies of the same group of dark Baboons as *P. doguera*, *furax* etc. How far it is distributed in its typical form is not yet known. I am, however, able to state that already at Hoima in the Uganda Protectorate the dark Baboons of this group are somewhat different. This can be done because my friend Prof. Dr. ROB. E. FRIES has kindly permitted me to examine and measure the skull of an adult male Baboon which he shot some years

ago at the place mentioned. The measurements of this are recorded to the right in the table above. From this can be seen that the Hoima Baboon is a little smaller in most dimensions, although these differences are of minor importance. The most conspicuous difference is that the Hoima Baboon has the nasals flat in front, and only little raised behind in which respects it resembles *P. furax*. The lateral walls of the rostrum are less vertical, and the pits above the roots of the molars are less deep, even than in the semia-dult *tessellatus*.

Although it thus appears to be racial differences between this Baboon and *P. tessellatus*, I prefer to leave it unnamed until more material has been obtained.

Perodictius arrhenii n. sp.

A male specimen collected near Masisi, a place situated three days west of Lake Kivu, Febr. 1914.

General colour brown, representing a shade between »snuff brown» (DAUTHÉNAY 303) and »dark fawn» (DAUTHÉNAY 307, 2). This general colour is more or less overlaid with blackish on the back. This black shade gradually increases from the lower back towards the interseapular region, where a marbled or mottled appearance is produced in which the black almost predominates. On the forehead, the region around the ears and on the upper arms the blackish is rather strongly represented as well by long black tips to the hairs. The basal parts of the fur is dark grey, or slaty gray. Especially on the middle of the back and on the upper back there is a great number of hoary-tipped hairs which in certain shades of light produce a frosty appearance. The long and thin, bristle-hairs (sensitive!), which project far above the fur, are especially numerous on the upper back, neck, head and shoulder-region, and they are all white. The outer side of the limbs are similar to the adjoining parts of the back, thus the upper arms are rather strongly overlaid with blackish, but the thighs not. The tail has the colour of the back, but is dusky at the tip. The inside of the hind limbs, and the genital and anal regions are buffy. The inside of the forelimbs, and the throat are a light shade of snuff-brown, or a little more buffish. The rest of the lower parts are whitish grey, especially in the middle with a buffish tint. The hands and feet are »raw umber» (DAUTHÉNAY 301) darkening to »sepia» (DAUTHÉNAY 300) on fingers and toes.

By this colour the present specimen differs very plainly from the grey *P. ibeanus* from Elgon. *P. ju-ju* of Southern Nigeria appears also to be very different in colour being described as »drab-grey», and with the »bristle-hairs practically absent».¹ *P. edwardsi* from Gaboon is said by DE WINTON² to be »dull greyish» and »characterized by its — short tail». The latter characteristic is mentioned in connection with the description by the author quoted of *P. batesi* (from Benito River) which is said to have the length of the tail 40 mm., and it is said to be »as short as or shorter than that of *P. edwardsi*». The tail of the latter cannot thus in any case be much longer than 40 mm. As the length of the same organ in the present specimen is fully 70 mm. (without hairs) it thus differs

¹ THOMAS: Ann. & Mag. Nat. Hist., Ser. 8, Vol. V, p. 351—352, 1910.

² Ann. & Mag. Nat. Hist., Ser. 7, Vol. IX, p. 48, 1902.

as there at least in two cases must be grave misprints, viz. when the zygomatic breadth is put to »21» (or less than the breadth of the brain-case), and the length of the mandible to »29» mm. If the figure indicating the length of the palate of *P. batesi*, viz. 20 mm., is correctly given by ELLIOT this dimension is very much smaller than in the present species, which thus appears to be fully distinct.

If the Potto from Mukimbungu, Lower Congo, really is, as I presume, *P. batesi* there appears to be another difference in dimensions between these two Pottos. The breadth across the outer side of m^2 is in *P. arrhenii* only 21 mm., but in *P. batesi* 24,3 mm. This stands in connection with the fact that the molars of the latter are very much larger. The transverse diameter of m^2 and m^3 is thus in the specimen from Mukimbungu resp. 4,7 and 5,1 mm.

Hemigalago demidoffi medius THOMAS.

One specimen from Masisi, 3 days west of Lake Kivu, Febr. 1914.

The skull is unfortunately broken, but I think the identification is correct.

Rousettus leachi A. SMITH.

A female from Masisi, Febr. 1914.

Hypsignathus monstrosus H. ALLEN.

One specimen without skull.

Micropteropus pusillus PETERS.

One specimen without exact locality.

Potamogale velox argens THOMAS.

One specimen from Masisi, Febr. 1914. The condylobasal length of the skull of this specimen is only 61,5 mm. against 66 mm. in the type, but otherwise the correspondence is satisfactory. The locality mentioned appears to be among the easternmost for this chiefly western type.

Felis leo bleyenberghi LÖNNBERG.

1 ♂ ad., Kabarc, $^{21}/_2$ 1913; 1 young specimen, Rutshuru, $^{6}/_8$ 1913; 1 ad. but young ♂, Beni $^{31}/_{12}$ 1914.

Some years ago the present author had the pleasure of describing a small-headed race of Lion from Katanga, representatives of which were kept in the Congo Museum at Tervueren.¹ The Lions collected by Capt. ARRHENIUS appear to belong to this same

¹ Rev. Zool. Africaine. Vol. III, fasc. 2, 1913.

race distinguished by its small head, and by the mane being confined to the neck, no extending over the shoulders. The dimensions of the skull from Kabare and another which is older and probably from Rutshuru (in the private possession of the present writer) are as follows.



Fig. 2. *Felis leo bleyenberghi* LÖNNBERG shot by Capt. E. ARRHENIUS at Rutshuru.

	♂ Kabare	♂ Rutshuru
Greatest length of skull	349 mm.	348,5 mm.
Condyllo-incisive length of skull	311 »	312 »
Basal length of skull	294 »	294 »
Zygomatic breadth	215 »	224 »
Width across upper carnassials	120,5 »	125,5 »
Breadth across foremost premolars	—	86 »
Width of choanæ a little behind palatal border .	33,5 »	38 »
Distance between heels of upper carnassials . .	79 »	79 »
Interorbital breadth	68,2 »	71,6 »
Width across postorbital processes	110 »	101 »
Least postorbital width	67 »	65 »
Breadth of bulla	30,2 »	31 »
Length of bulla	50,5 »	52,6 »
Length of upper carnassial	37 »	37,4 »
Length of nasals	92,5 »	94,2 »
Combined breadth of nasals in front	59,2 »	62,3 »

HELLER has named a Lion from Uganda *Felis leo nyanzae*. The cranial measurements, which he has communicated, indicate a comparatively small-headed race, most dimensions are, however, larger than those of *Felis leo bleyenberghi*. With regard to the colour

the specimens of the present collection are intermediate between the very pale typical Katanga Lion, which I described as being »pale yellowish grey, sand-coloured, more yellowish than 'putty colour' (DAUTHÉNAY 311)», and the »ochraceous-tawny» and »ochraceous» Uganda Lion, as HELLER describes the latter. It appears probable that both these comparatively small-headed races of Lion gradually merge into each other in the country west of Victoria Nyanza. The type locality of *F. l. nyanzae* is situated north of this lake.

The measurements above prove a great correspondence in dimensions between these two skulls, and at the same time that they are similar to the type of the Katanga Lion, which latter, however, is a little broader. This difference is not great. Unlike the condition found in NEUMANN'S *massaicus*-race the distance between the bullæ is less broad than the breadth of the choanæ.

The specimen from Beni has not yet attained full size, and therefore it does not admit a direct comparison. As far as can be seen, it does not differ except in such juvenile characteristics as are still retained, f. i. the spots on the belly and on the hind legs are more conspicuous.

The young specimen from Rutshuru has still its milk-dentition. The greatest length of the skull is 178 mm. The »milk carnassial» dp^3 has a length of 24 mm. The lower canines have on their inner side a well developed cusp against which di^3 works. The spots on the legs and on the belly are well conspicuous. On the hind legs they are partly dark brown, but small, only about 1 cm.

***Felis pardus centralis* n. subsp.**

Three young specimens with milk-dentition collected at Rutshuru resp. $\frac{6}{3}$, $\frac{9}{4}$, and $\frac{2}{10}$, 1913. A fine male from Kabare at Lake Albert Edward killed $\frac{19}{5}$, 1914.

The »milk-carnassial» of one of these young Leopards measured 16 mm. in length, in another 18 mm., which probably is due to difference in sex.

The skin of the adult male Leopard from Kabare is very beautiful and striking with regard to its pattern. The rosette-spots are large, in the shape of somewhat irregular rings often with 1—3, sometimes even 4 small black spots in the centre. The pattern reminds thus in a high degree about that of a Jaguar. Thanks to the large size of the rosettes the ground colour only forms a reticulate system, which is very pale. From white on the belly it shades gradually through the palest shade of »Maize yellow» (DAUTHÉNAY, Rep. de Coul. 36, 1) on the flanks to »yellowish buff» (l. c. 310, 2 & 3) on the back. The centre of the rings have as usual a more saturated colour beginning with »Maize yellow» (36, 3 & 4) down on the lower flanks and gradually reaching »yellowish buff» (310, 3 & 4) on the back. The ground colour of the nose and upper parts of the head is »Maize yellow» (36, 4), on the sides of the neck a lighter shade of the same tint, but on the upper neck »yellowish buff» (310, 3). The ground colour of the throat is white, extending up on the sides of the head almost to below the eyes with a light shade of »Maize yellow». The legs are similar. From this may be concluded that the ground colour all over is very light. The spots on the head are solid, very small on the interorbital region (5—

7 mm.), not much larger on the lips, but on the crown 12—20 mm. From the nape along the upper neck is mesially a row of rather small, elongate spots, and on either side of these



Fig. 3. *Felis pardus centralis* from Kabare.

a row of larger black spots, several of which have a small buff centre. On the back above the shoulders the mesial row may be traced, and on the sides of the same the nearest spots as well are solid and elongate. On the middle of the back the mesial series is less conspicuous as such, especially as some of the spots become annulate with buff centres, but the black of the rings is then always broader than in the lateral rings. On the posterior back the mesial series and its accompanying side rows become well visible again, the former with solid spots, the latter with small buff centres, but broadly black. At the base of the tail this pattern is dissolved into narrow elongate spots which are irregularly crowded into transverse series counting about 7—8 spots. On the apical third of the tail these become confluent into irregular transverse spots, or bands separated from each other by narrow white rings. The pattern of the shoulders is very indefinite. It is made up of small spots which often become confluent into many transverse bands, and sometimes form small rings. The sides of the body are entirely covered with the large (mostly 5—7 cm.) rings, already mentioned, which often have central spots. The spots on the lower parts and the legs are solid, although partly grouped into rosettes.

The pattern of this Leopard differs chiefly from that of other African Leopards by its large, partly Jaguar-like rings.

CAMERANO has described¹ a Leopard from Ruwenzori, named by him *Felis pardus ruwenzorii*. In some respects this animal resembles the present one, but there are also several differences. The author quoted describes the general colour of his subspecies as

¹ Il Ruwenzori, Relazione scientifica, Vol. I.

»terra ombra naturale chiara» and in another place as »brunastre eon tendenza — all'olivastro», which appears to differ considerably from the general colour of the Leopard from Kabare. To judge from CAMERANO's figure the rings on the flanks are much heavier, black with comparatively small centres. Also in other places the black spots or rosettes are heavier, and the spots on the tail are roundish. As Leopards vary a great deal individually this difference may perhaps not be fundamental, but for the present they appear to exclude an identification. On the other hand this Museum received in the year 1905 the skin of a very large Leopard which Lieutenant KARL ERIKSSON had collected in the interior of Belgian Congo. This skin is more similar to that from Kabare, and has large ring-like rosettes some of which have, as in the Jaguar, central spots, sometimes even 4 such in a ring.

The length of the unstretched softened skin from Kabare is from snout to vent 150 cm., and the length of the tail is 84 cm. If the latter is laid forward over the back, it does not reach the shoulders, and it is thus short. It is, however, not so short as in the Ruwenzori Leopard in which it only measures 68 cm. according to CAMERANO. In the latter subspecies the end of the tail has longer hairs on its distal fourth so that it almost appears somewhat bushy on the figure. The Leopard from Kabare has also longer hairs (26—28 mm.) on the distal part of the tail than at the proximal (15—16 mm.), but this appears less pronounced. — It must here be kept in mind, that all Leopards have the hairs on the distal portion of the tail longer than on the proximal parts, although it often is little visible.

The young Leopards from Rutshuru must be supposed to belong to the same race as the one from Kabare, and it is therefore of interest to state that even in such young specimens the rings are quite well developed and defined all over the flanks, which appears rather early, but it proves that this pattern is fairly constant in these parts of Africa.

The skull of the Kabare Leopard indicates an adult, but not very old animal, because the basal suture is still open. Considering this the dimensions of the skull prove

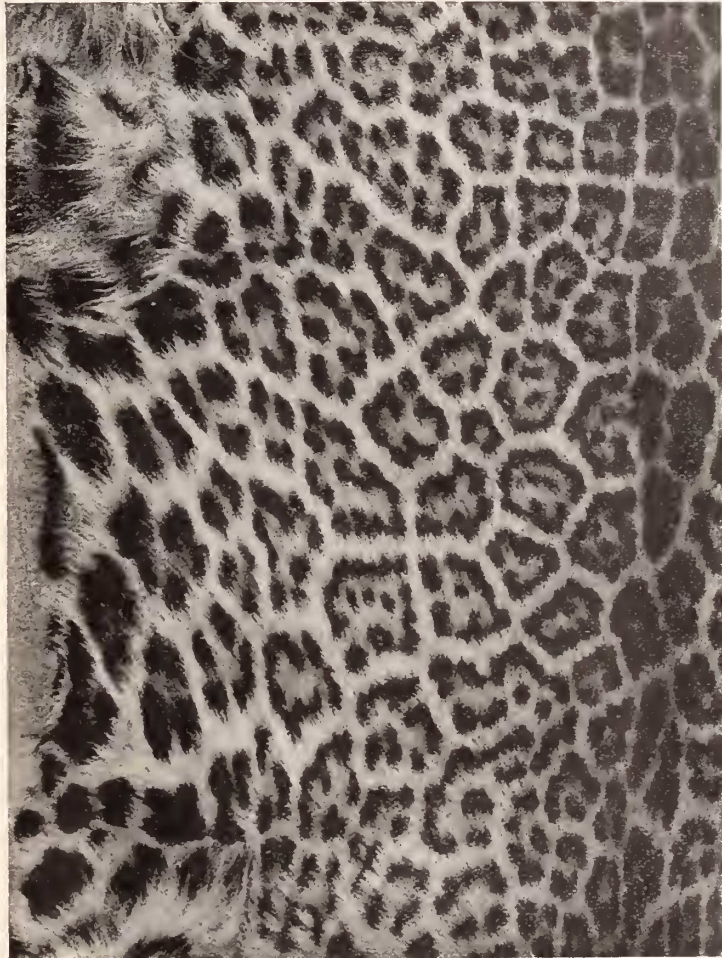


Fig. 4. A piece of skin from the left flank of *Felis pardus centralis*.

that it belongs to a large race, all measurements being, as is shown below, larger than those of the Ruwenzori Leopard which has the total length of the skull 224 mm. On the other hand the measurements are smaller than those which have been recorded by Pocock for some West-African Leopard skulls, the total length of which varies between 278,1 and 262,5 mm.

A Leopard »from the Loita Plains, Southern Guaso Nyiro district, British East Africa» described by HELLER under the name *Felis pardus fortis*¹ has also a very large skull with the greatest length amounting to 260 mm.,² and also other dimensions greater than those of the present specimen from Kabare. *F. p. fortis* is, however, very different. It is described as having »numerous small rosetted spots, the central color of which is not differentiated in shade from the general ground color». Unlike the Leopard from Kabare *F. p. fortis* has no upper first premolar, and its bullæ are much smaller not rising to the level of the mastoid process.

Another Leopard, from Gondokoro, also described by HELLER (in the same paper as the foregoing) under the name of *Felis pardus chui* is also a large animal with the greatest length of the skull 243 mm. It is said to have »widely isolated spots», »more extensive white surface to the underside of the tail» (than *suahilica*). It has smaller upper carnassial, but broader pterygoid fossa than the Leopard from Kabare, the skull measurements of which are recorded below.

	♂ from Kabare	♂ from Inner Congo
Total length of skull	233 mm.	239 mm.
Condyle-incisive length	210 »	219 »
Basal length	196 »	205 »
Zygomatic breadth	141,5 »	147,6 »
Length of nasals mesially	54 »	—
Combined breadth of nasals anteriorly	35,5 »	—
Breadth of brain case	77,7 »	75 »
Breadth of mesopterygoid fossa	23,5 »	2 ,5 »
Interorbital width	39 »	38,6 »
Length of palate mesially	103 »	104 »
Length of p^2	18 »	18,2 »
Length of p^3	26 »	26 »
Distance between bullæ	21 »	21 »
Breadth of bullæ	21 »	21,5 »

The capacity of the brain cavity of the Leopard from Kabare is 170 ccm. and that of the Congo Leopard about 165 ccm. In the table above are at the side of the measurements of the Kabare skull also recorded the corresponding ones of a male Leopard skull from Inner Belgian Congo which has been presented by Lieutenant KARL ERIKSSON, and which closely resembles this one.

¹ Smithsonian. Misc. Coll., Vol. 61, no 19, Washington 1913.

² In »Life Histories of African Game Animals» by ROOSEWELT & HELLER the same leopard is said to be from the »Mau highlands of British East Africa».

A further comparison between these measurements and those recorded by Pocock¹ for the skulls from Sette Kama, Gaboon, proves that there are several important differences. In the present skull from Kabare the breadth of the bulla is equal to the distance between both bullæ (the same is practically the case with the other Congo-skulls as well), but in the Gaboon Leopards the former measurement is greater and always more than 25 mm. Pocock appears also to lay much stress on the shape and breadth of the mesopterygoid fossa. He calls that of the Gaboon Leopards narrow with almost parallel sides. The by him published figure and the recorded measurements prove this.

The breadth of the mesopterygoid fossa in the skulls from Gaboon varies between 14 and 18,7 mm. This narrowness is decidedly in contrast with the broadness of the same dimension in the Kabare skull. The skull presented by Lieutenant ERIKSSON, and which is from the interior of the Congo forest, is also much broader in this respect than the specimens from Sette Kama. Pocock has also at the same time pointed out that »the anterior border of the fossa is at all events as a rule produced backwards into a sharply pointed angle in Asiatic Leopards, whereas in African Leopards it is generally at least markedly straighter, sometimes indeed slightly notched». To this I must say that unfortunately the shape of the posterior border of the palate, or as Pocock prefers to name it, the anterior border of fossa mesopterygoidea, is not constant neither in Asiatic, nor in African Leopards. To prove this I may mention that among three male Leopard skulls (all adult), which Count NILS GYL-DENSTOLPE has brought home from Siam, one has this border forming a backwards projecting angle, in the second it is straight,



Fig. 5. Palatal view of skull of *Felis pardus centralis* n. subsp.

and in the third² it is decidedly concave. Further among Leopard skulls from Eritrea collected at Gheleb by the Swedish Missionary, Pastor K. RODÉN one has a prominent mesial point on this border, but in another it is notched and so on. This variability reduces also the importance of the difference with regard to the posterior palatal border which exists in the Kabare skull and the one presented by Lieutenant ERIKSSON. In the latter this border is almost straight, although somewhat irregular, in the former it has a comparatively broad mesial process which is notched at the end (fig. 5).

¹ Proc. Zool. Soc. 1909, p. 204—209.

² From the Nan province.

The fact remains, however, that in the interior of Congo lives a race of Leopards which have large ring-like rosettes, partly provided with 1—4 small spots in the centre, broad obovate (more than 20 mm.) and the interspace between the bullae about equal to the breadth of the bulla. This race is, as it seems, well defined from the Leopards of the west coast districts in Gaboon with regard to their skulls as described by Pocock, who has considered them to represent SCHREBER's *leopardus* and thus named them *Felis pardus leopardus*. SCHREBER describes his »*leopardus*» from Africa and says: »Insonderheit bewohnt er die Westküste, von Senegal an bis zum Vorgebirge der Guten Hoffnung, häufig». From a geographical point of view there is thus nothing prohibiting that the Gaboon Leopards are named »*leopardus* SCHREB.». This is, however, not sufficient. It must also be considered, how SCHREBER describes the animal to which he gives this name. He says¹ about it: »Die Länge des Körpers nicht viel über vier, des Schwanzes zweien bis drittheil Fuss», and he adds »kleiner als der Panther». The picture of the animal named »*Felis leopardus*» shows comparatively small spots, while the picture of SCHREBER's »*Felis panthera*» which is said to be larger displays large annular spots on the sides of the body. The latter, or the »Panther» is said to be at home as well in Africa as in Asia. It can be concluded from this that SCHREBER believed it possible to distinguish 1:0 a large Leopard, »*F. panthera*», with broad annular spots living as well in Africa as in Asia, and 2:0 a smaller Leopard, »*F. pardus*», with smaller rosette-like spots inhabiting Western Africa from Senegal to Cape. With the exception of the distribution this SCHREBER's opinion is in accordance with that of many sportsmen, who speak of a small and small-spotted »Leopard», and a large and great spotted »Panther». As Pocock's Leopard skulls from Gaboon were very large, indeed exceeding in length the then known record for such skulls, it is evidently erroneous to regard them as belonging to the race which SCHREBER himself declares to be the smaller.

Pocock also quotes ERXLEBEN as authority for a »*Felis Leopardus*» from West Africa. It is also true that ERXLEBEN says:² »Habitat in Guinea et propinquis terris», but he quotes SCHREBER's *Felis leopardus* as identical, and the measurements which he records for »*Felis Leopardus*» are also the same as SCHREBER's for the same animal. On the other hand ERXLEBEN's measurements recorded for his »*Felis pardus*» which is identical with SCHREBER's »*F. panthera*», are much larger. Thus also by ERXLEBEN the specific name »*leopardus*» is given to the smaller of two recognized kinds of Leopards. It is accordingly inappropriate to use this name for the largest, or at least one of the largest known races of African Leopards, as Pocock has done.

Felis pardus leopardus SCHREBER must be reserved for a comparatively small African Leopard with small closely set spots forming rosettes (»*maculis parvis nigris in circulos dispositis maximeque approximatis*»), while *Felis pardus panthera* SCHREBER (= »*F. Pardus*» ERXLEBEN, nec »*F. Panthera*» ERXLEBEN) is a large Leopard with ring-formed spots with black spots in the centre (»*maculis nigris e minoribus quatuor vel quinque in anulum dispositis — — centris nigris*»). SCHREBER considered his *F. panthera* to live as well in Africa as in Asia, but Africa is mentioned in the first rank.

¹ SCHREBER, Säuget. III, p. 388.

² Systema Regni Animalis, Classis I, Mammalia. Lipsiae MDCCLXXVII.

It is thus justifiable to use this name also for an African Leopard with SCHREBER as authority. ERXLEBEN's »*Felis Panthera*» is on the other hand something quite different as it is identical with SCHREBER's »*Felis Vncia*». Therefore it cannot be approved when TROUESSART in his »Supplementum» to »Catalogus Mammalium» calls the Indian Leopard »*Felis pardus panthera*».

Before the two old racial names »*panthera*» and »*leopardus*» are definitely placed, if it is possible, our knowledge about African Leopards must become considerably widened and more satisfactory. Among the numerous skins of Leopards which I have seen from Eritrea, East and South Africa none has had such distinctly annular spots with small spots in the centre as these two skins from inner Congo and the Lake Albert Edward district, and I do not doubt that they constitute a separate geographic race. Although it agrees well enough with SCHREBER's short diagnose of his »*Panthera*» it does not seem probable that the author quoted at that early time could have obtained his type from the centre of Africa. Partly therefore, and partly because the name »*panthera*» has been used in so many different meanings I have thought it better to give a new name which at one time alludes to the geographical origin, and also to the remarkable pattern described above.

In Proc. Zool. Soc. London, 1907 (p. 783—5) LYDEKKER has described and figured the skin of a large-spotted Leopard from Uganda. He refers this to »*F. pardus suahelica* NEUM.». It is, however, very doubtful what NEUMANN has meant by this name. It is only said to be given to »die grossgefleckte ostafrikanische Form des Leoparden», because that one »hatte bisher noch keinen Namen».¹ This is, however, hardly any description, and nothing more is said for the recognition of the Leopard with this new name. Neither has NEUMANN indicated any type-locality as he says:² »Der Leopard ist an geeigneten Stellen an der Küste wie im Inneren überall häufig.» Further he mentions localities as distant as Tanga and Uganda. LYDEKKER's large-spotted Leopard from Uganda appears to be identical with CAMERANO's *Felis pardus ruwenzorii* to judge from the figures of both. The rings in both are broad and compact with a comparatively less broad central space. As CAMERANO had given the name »*ruwenzorii*» before LYDEKKER accepted NEUMANN's name »*suahelica*» for the Uganda Leopard, the latter name cannot on LYDEKKER's authority be used for the Uganda Leopard, and on NEUMANN's, as set forth above, still less.

LYDEKKER believed to find some Jaguar-like features in the Uganda Leopard, but as shown above and corroborated by the figures this is much more the case with *F. pardus centralis*.

***Felis ocreata* GMEL.**

A young specimen without skull. It can not therefore be ascertained to which subspecies it may belong.

¹ Zool. Jahrb., Abt. Syst. Geogr. etc., Bd. 13, Jena 1900, p. 551.

² l. c. p. 552.

Felis serval ERXL.

There are three Servals in the collection. Two of these are rather young and there is no skull to the third, which is a large one. It is thus difficult to decide to which subspecies these specimens may belong. They may be regarded as comparatively large-spotted, but the spots are perhaps not quite so large as in *hindei*. Including the dorsal stripes and rows there are about 17 series of spots in the large specimen. The black cross-bands on the arms and on the throat are strongly developed, and the blackness of the feet is also intense.

Civettictis civetta SCHREBER.

1 ♂ semiadult from Masisi 1914. It is a rather dark specimen with the spots partly confluent to transverse bars.

Genets of the *Genetta servalina*-group.

Four specimens in the present collection belong to the above group. They have¹ short-haired tails with the light rings narrower than the black and from nine to eleven in number; both hind and fore feet blackish brown, the chin light-coloured; the dark spots of the body everywhere solid, not ring-shaped and so on.

By these characteristics they are distinguished from related Genets from Western and Central Africa. *G. angolensis* BOCAGE has the chin black and only 3 or 4 pale tail-rings. It represents, however, as MATSCHIE has suggested, possibly a melanistic aberration. *G. dubia* MATSCHIE has a short tail with only 6 pale rings; *G. poensis* WATERHOUSE, the type² of which appears to be somewhat melanistic, has the pale tail-rings reduced to lateral patches. The comparison is difficult to make, but *G. poensis* appears to be more small-spotted³ than the present specimens. POUSARGUE has identified a Genet from Mayumba with *G. poensis*, and his description of this specimen agrees on the whole quite well with three specimens, which the R. Swedish Nat. Hist. Museum has received from Debundseha, Cameroon, although the pale tail rings of the latter are more developed. A striking characteristic common to POUSARGUE's specimen and those from Cameroon consists in the narrowness of the dark longitudinal streaks of the upper neck.

G. johnstoni as described and figured by POCOCK⁴ displays also a pattern different from that of Capt. ARRHENIUS's Genets. In the former »the spots of the two uppermost rows coalesce wholly or mostly into definite longitudinal stripes», while the corresponding spots of the latter are very distinct. In *G. johnstoni* the (3) upper rows of spots »differ from the spinal stripe in colour, since they consist of black and red hairs intermixed»,

¹ In accordance with MATSCHIE's key (Verh. d. V. Internat. Zool. Congr. Berlin 1901).

² As figured by POCOCK, Proc. Zool. Soc. London 1907.

³ MATSCHIE (l. c.) suspects *G. poensis* to be identical with *G. pardina* IS. GEOFF., but POUSARGUE (Ann. Sc. Nat. Zool., 8 Sér., T. 3, Paris, 1896) has pointed out that the latter has ring-shaped spots, while those of the former are solid, more numerous and close set. *G. pardina* has the feet »gris jaunâtre», whereas in *G. poensis* they are blackish brown.

⁴ Proc. Zool. Soc. London, 1909, p. 1041.

while the spinal stripe is always black. The same Genet has also not more than seven pale rings.

G. victoriæ THOMAS might be excluded from the present comparison, because it has only six white rings on its comparatively bushy tail (with hairs 25—30 mm. in length.

G. bettoni THOMAS differs plainly from the Genets of the present collection by having the »spots on the anterior half of the body between the withers and loins» — — »replaced by irregular rings, black, with fawn-coloured centres».¹ In addition to this its hind limbs are greyish brown, and its skull much smaller.

G. genetoides TEMMINCK has only five partly incomplete tail rings.

It remains thus among these Genets with dark feet, and narrow pale rings on their short-haired tails only *G. servalina* and *G. aubryana* PUCH., and these two are evidently, as already POUSARGUE has pointed out, very closely related, or perhaps not specially different. As especially characteristic to both, the author quoted lays stress upon a fact which PUCHERAN already in the original descriptions² has set forth, viz. that neither of these »species» has a continuous black dorsal stripe. About *G. servalina* PUCHERAN says: »Le dos ne présente pas de raie noire continue», and concerning *G. aubryana* he expresses the same thing by saying that the median spots of the back »ne sont point réunies pour former une véritable bande». This characteristic can be observed in the four Genets now in question, and their general pattern agrees essentially with PUCHERAN's description. *G. servalina* and *aubryana* differ from each other, however, in another respect, viz. with regard to the markings of the tail. The former has narrower white rings, and the tip of the tail black (only with a small white spot on the lower side of the extreme tip in a female), the latter has somewhat broader white rings (but nevertheless narrower than the black), and the tip as well broadly pale. With regard to these patterns of the tail Capt. ARRHENIUS's Genets represent both types:

G. servalina-type: 1 ♂, Masisi, near Kivu, Febr. 1914; 1 ♀ ad. and 1 ♂ juv., Beni, Aug.—Sept., 1914.

G. aubryana-type: 1 ♂, Masisi, near Kivu, Febr. 1914. The three first mentioned specimens are, in spite of difference in sex and age, so alike as three animals of this kind can be. The Genet-markings of the head are very distinct, especially in the old male. The smallest anterior vibrissæ are black, the others black at the base, but for the most part white. A black stripe runs mesially from the snout on the forehead surrounded on the sides by broad grizzled whitish bands. From the black upper lip runs a black band over and through the eye, bifurcating above the posterior half of the eye to include a white spot. Below the black lower eye-lid is a large white spot. From the space between the ears four black stripes run along the upper neck, the median pair is narrower and sometimes broken. Outside of these four stripes, on either side of the neck, runs a broad black stripe consisting of confluent spots, the foremost spot behind the ear usually, and often some of the spots in front of the shoulders being isolated. At the withers a narrow mesial black stripe (or series of linear black spots) appears between the median pair of neck stripes, and the latter become somewhat broader and dissolve partly into series

¹ Another difference is that *G. bettoni* has »the light mark on the sides of the muzzle less distinct than usual».

² Arch. du Muséum d'hist. nat., Paris, T. X, 1858—61.

of spots. The just mentioned unpaired narrow mesial stripe (or series of spots) can be followed about half way to the loins. On the posterior back it is substituted by a much broader (mostly 10—12 mm.) black band formed by confluent spots which only in the youngest specimen are partly isolated. The outer pair of upper neck stripes bifurcates at the shoulders into two longitudinal series of roundish (on the posterior back elongate sometimes rectangular) black spots. Below these are still some series of smaller spots so that at the middle of the body about six series of spots may be counted on either side of the median line. On the back and the sides the spots are well defined from each other in front and behind, although the interspaces are narrow, but especially in the male they have a great tendency to coalesce in a vertical direction so that irregular transverse bands are formed by the confluence of 2—3, or even 4—5 spots. The ground colour is very light yellowish grey (not much darker than DAUTHÉNAVY's »stone colour», 312, 4) with a shade of fawn on the middle of the back, and on the face. This latter shade is more pronounced in the female and the young animal. On the cheeks there are some small black spots. Chin and throat greyish white, with a slight buffish suffusion in the female and young. Across the lower neck about four transverse series of black spots are to be seen; the foremost of these, which is situated about halfway between head and chest, is most conspicuous and forms an almost continuous cross bar in the males. Interbraehial space blackish grey with some scattered black spots. The belly is lighter by means of whitish tips to the basally dark smoky grey hairs. The frontside of the fore legs is grey with black spots, the inner side of the same and the feet blackish brown. The hind legs and feet are blackish brown to the same extent, but there may be a greyish spot on the upper side of the latter. The tail is black with 9, in the adult male 10 narrow white rings with a breadth on the dorsal side of about 5—8 mm., on the ventral side they are somewhat broader. In this number of rings is not counted the similar band just above the root of the tail. The tip of the tail is black, but in the female as mentioned above, there is a small white spot just underneath the tip, and in the male the corresponding spot is not quite black, but pale brownish. Length of fur on the back 15—18 mm., at the base of the tail not longer, but in the sacral region of the male about 20 mm.

The specimen of »*aubryana*-type» is rather similar, but differs in the following points. The head and back is provided with a rather strong tint of fawn, and isabelline on the sides. This makes the head markings somewhat less prominent. The median pair of stripes of the upper neck is narrower and more broken up in small spots. The median stripe of the posterior back is narrower and less defined. The spots on the whole body are comparatively smaller (but about as numerous), separated by somewhat broader interspaces and show less if any tendency to become confluent. The lower parts have an isabelline tint; the interbraehial space is less dark, and the lower neck does not show any definite transverse arrangement of the spots. The tail is black with 10 white rings, which are considerably broader than in the other specimens, from 12 to 20 mm. on the upper side, broader below. The tip is pale, although not pure white as the rings, but pale brownish at the extreme end, and more whitish subterminally on the lower side. These differences do not appear very important, but might partly, f. i. the

buffish or isabelline tint, the pronounced isolation of the spots etc., be regarded as retained juvenile characteristics, although it at the same time must be admitted that the much younger male specimen from Beni is more like the adult specimens described above. As a white resp. pale brownish spot is present below the tip of the tail of the adult *servalina* specimens described above, and also in the corresponding place in PUCHERAN's type, it appears that not too much stress can be laid on the fact that the *aubryana*-like specimen has the tip of this organ pale. In both cases the white spot and the pale tip may represent the remains of a pale ring. This is the more probably as the pale rings always are broader on the lower side, and thus the last remnant of such a ring is naturally to be found on the lower side of the organ. PUCHERAN has also expressed a similar interpretation saying about *G. servalina*:¹ — — »L'extrémité caudal est noirâtre; cette couleur se fond en dessus avec celle du dernier anneau; en dessous, elle en est séparée par une tache blanchâtre, vestige d'un anneau incomplet» — —. It will thus appear as if the difference between typical *servaline* and *aubryana* should not be very fundamental. In any case I cannot regard the young male from Masisi as representing but the same species as the others, although individually somewhat different.

Another question is whether the adult specimens described above is fully identical with PUCHERAN's *Genetta servalina*, or whether it possibly represents a geographical race, as there are some small discrepancies to be noted. One of these is the strongly developed »teinte rousse», which PUCHERAN regards characteristic for *G. servalina*, but I cannot admit great importance to this as it, no doubt, is subjected to individual variation. More stress might be laid on such differences in pattern as the presence of a continuous black mesial stripe along the posterior portion of the back and the decidedly striped upper neck etc. The comparative size of the spots is also different. In the present specimens the largest spots are found in the second row from the median line, while PUCHERAN says that the spots next to that line are smallest, and those on the abdomen largest. POUSARGUE confirms this and speaks also about the great irregularity of the spots of the back and sides, »et l'on y chercherait vainement — — une orientation suivant des lignes longitudinales parallèles». Such a statement has no application on the present specimens in which longitudinal series of spots may be quite well discerned.

Although I am not fully convinced that the differences enumerated are important enough for the creating of a separate subspecies. I think, however, that to avoid confusion it is the best proceeding to give the Genet from Beni and Masisi a separate name *Genetta servalina intensa* (in consequence of its more pronounced pattern). Such a proceeding appears also to be strengthened by the measurements recorded below.

The skins are not so carefully made that their measurements can be admitted to have more than approximate value, but the dimensions of the two adult specimens may nevertheless be communicated:

	♂	♀
Head and body	58 mm.	54,5 mm.
Tail	41,5 »	43,5 »
Hind foot	79 »	75 »
Ear (dry!)	33 »	33 »

¹ l. c. p. 117.

The small size of the dry hind foot is especially noteworthy, because THOMAS & WROUGHTON¹ have indicated the length of that member of a female *G. servalina* from Gaboon to be 101 mm. The above measurements of the hind feet agree better with those of *G. beltoni* according to the authors quoted. But in addition to the differences from this species in colour and pattern, as already discussed, the great size of the skull proves the difference. The greatest length of the female skull is 88,5, and that of the male 92,2 mm. Condylbasal length of the former 86,6, of the latter 88,6 mm.; basal length resp. 81,7 and 83,5 mm.; zygomatic breadth 38,6, and 42,5 mm.; interorbital width 11,9, and 13,5 mm. Outer diameter of p^1 7,8 mm. as well in male as female, its longest diameter in the male 8,7 mm.; transverse diameter of m^1 in the same 7 mm. Length of palate 41 mm., length of bulla 18 mm. Length of p^1 6,4 mm.; of m_1 7,1 mm. (in *G. beltoni* 6 mm. according to THOMAS).

When describing the mammals of the Ruwenzori-Expedition² OLDFIELD THOMAS and B. C. WROUGHTON give some notes on specimens of *G. beltoni*. They mention there also the difference in size between the upper carnassial of the female and male of this Genet, the length on the outer side of this tooth being in three females from 6,9 to 7,3 mm., but in a male 8,1 mm. As similar observations has been made on other Genets, f. i. *G. stuhlmanni*, it appears noteworthy that in male and female of the Genet now described this tooth has similar dimensions.

Genetta stuhlmanni MATSCHIE.

Two male specimens from Masisi (three days west of Lake Kivu), Febr. 1914. One male from Rutshuru, Dec. 3, 1914.

Both the former, one of which is young, are somewhat paler than the Rutshuru specimen which appears most typical. On the whole the adult specimens agree very well with my specimens from the Kenia district, which proves that this species is fully recognizable at both ends of its area of distribution.

Nandinia binotata GRAY.

A young female from Masisi near Kivu, Febr. 1914, and an adult female.

Both these have a well marked pattern with spots and stripes sharply defined. In the young the pair of dorsal-spots are white, in the adult buff. The specimens are thus as could be expected of the typical western form and differing from the Kavirondo race described by HELLER³ 1913. It is thus probable that all Nandinias to the west of the Great Lake region are of the main form, and that on the eastern side of the same, in the drier climate the pattern more and more fades out to the *gerrardi* form of Nyasaland and Kilimanjaro. The latter place from which I recorded it in the year 1908 appears to be the most eastern locality where this genus has been found.

¹ Trans. Zool. Soc. London, Vol. XIX, part 5, p. 495.

² Trans. Zool. Soc. London, Vol. XIX, part 5.

³ Smithsonian. Misc. Coll., Vol. 61, n:o 13.

Mungos ichneumon centralis n. subsp.

A female specimen from Beni, Aug.—Sept. 1914, and another specimen which unfortunately is not labeled. The former appears, to judge from the size to be rather young.

These specimens differ to some degree as well from East, as from West African specimens in this museum. The back is grizzled with 3—5 mm. broad white rings to the otherwise black hairs, but on the flanks the colour is very different, isabelline brown. This is effected by the there buffish white parts of the hairs occupying a much broader space, than is the case on the back (especially the whitish tips are very long), and partly by the fading of the narrowed dark rings to brownish, and finally by the shining through of the under fur, which in the smaller specimen is a pale shade of »buff» (DAUTHÉNAVY, Rép. de Coul. 309, 1), in the older more resembling cinnamon. On the neck there is a strikingly sharp line of demarcation between the median dorsal band of grizzled black and white, and the paler sides where the black has partly faded to brown, and the light rings on the hairs dominate at the same time as the under fur shines through. Such a pattern is not to be seen in the specimens of *M. i. parvidens* LÖNNB. from Lower Congo which geographically ought to be the next neighbour. On the other hand the bright colour of the under fur is common both to the present specimens and *M. i. parvidens*. On the back of the former it may be termed cinnamon, a little duller on the anterior back, brighter and more inclining to rufous on the posterior back. This is very much in contrast to the colour of the under fur of East African specimens (in this museum) which is more brown, resembling raw umber, or snuff brown. *Mungos ichneumon* of Egypt again appears to have its under fur very richly coloured as it is described in »Zoology of Egypt» as »brick-red with dark sootbrown bases — — graduating to yellow and buff on the neck».

The under fur of the present specimens is also much more strongly developed than that in specimens from Lower Congo and those from East Africa in this museum. On the lower back it attains a length of about 23 mm., on the anterior back it is somewhat shorter. The hairs are in the former place 60—70 mm. and in the latter 45—50 mm. On the basal portion of the tail the hairs attain a length of 90—120 mm. The fur is thus generally much longer than in *M. i. parvidens*. Just below the terminal black tuft the tail of the older specimen for fully 6 cm. is clothed with elongated pure white hairs which surround the black terminal tuft. In the younger specimen this white portion is not developed, but the hairs have long white tips. On the intermediate short-haired portion of the tail the dark rings of the hairs are very pale, and the whole looks rather uniform isabelline brown (similar to the colour of the flanks), but sharply defined from the above mentioned subterminal white.

The strong development of the fur of these specimens, if compared with their relatives from Lower Congo, undoubtedly stands in correspondence with a somewhat harsher climate of their native country, as there are many analogies to such a condition to be found elsewhere. This characteristic alone appears thus not sufficient to distinguish these specimens as representatives of a different geographic race, but taken together with the different colour as described above I think that it forms reason enough for doing so.

Mungos paludinosus conf. rubescens HOLLISTER.

Two specimens probably from Rutshuru, only one of them with a skull.

As the fauna at the locality mentioned chiefly is of a West African type it appeared to be of interest to compare these specimens in the first rank with western specimens of the Marsh Mongoose group. The investigation showed then very soon that the affinities were not to be found in the west, but as complete descriptions of some western representatives of this group of Mongooses may prove to be of value at future studies, I have decided to publish the following notes, the more so as I have been able to receive some direct knowledge about TEMMINCK's »*Herpestes pluto*». The relation of this form to the Cameroon Marsh Mongoose has been rather obscure to me hitherto, but the information, which I have now been able to obtain, may be useful to others, and is thus included.

The following measurements indicate the dimensions of the type-skulls of TEMMINCK's »*Herpestes pluto*», which the present author has had the pleasure of measuring thanks to the great kindness of the director of the Rijks Museum van Natuurlijke Historie in Leiden, Dr. E. D. VAN OORT.

	♂	♀ (?)
Greatest length	108,5 mm.	107 mm.
Condylolncisive length	98,7 "	97,2 "
Basal length	93,0 "	91,5 "
Zygomatic breadth	58,6 "	—
Interorbital breadth	18,7 "	19 "
Least postorbital breadth	15,8 "	17,6 "
Distance from orbit to gnathion	32,3 "	32,0 "
Palatal length from gnathion	59,7 "	—
Palate breadth outside p^4 (posteriorly)	36,4 "	34 "
Combined breadth of upper incisors	12,6 "	13,7 "
p^3	6,5 × 5,1 "	6,2 × 5,3 "
Longest diameter of p^4	11,7 "	11 "
Length on outor side of p^4	9,8 "	9,3 "
Transverse diameter of p^4	8,2 "	8,2 "
m^1	10 × 7 "	9,5 × 6,7 "
m^2	6 × 3 "	6 × 3 "
Back of m^2 to front of canine	36,8 "	37,3 "
Length of lower jaw	70 "	—

It is especially noteworthy that very small p^1 are present only in one of the specimens which is signed »♀». In the other there is no trace of p^1 and the diastema is short. Both specimens are fully adult with well developed *crista sagittalis*. The upper canines of both specimens are provided with well developed sharp knife-like edges as well in front as behind, and these edges are by a fluting or groove both on the inner and the outer side separated from the central cone of the tooth. Thanks to this the upper canines look very broad when viewed from the side, their greatest antero-posterior diameter in the male amounting to 7 mm.

The type specimens of TEMMINCK's *Herpestes pluto* are all mounted and could therefore, of course, not be sent, especially during the now prevailing conditions, but Dr. VAN OORT kindly sent me »den Balg eines Liberia-Exemplares, welches ganz mit den Typen von der Goldküste übereinstimmt». This accordance is also corroborated by the shape of the upper canines of the Liberia specimen which have the same anterior and posterior edges, and flutings as TEMMINCK's types. p^1 is present on both sides.

The general colour of this Liberia Mongoose is dark brown, somewhat darker than the darkest shade of DAUTHÉNAY's »chocolate» (Rép. de Coul. 343, 4). The legs and feet have this colour quite uniform. On the body it is somewhat modified by the underfur which shines through and has a lighter colour similar to DAUTHÉNAY's »burnt umber» (304, 1). The long hairs are also provided with small buffish rings partly subterminal, but partly on the proximal portion of the hairs as well, the latter do not, however, differ from the former. On the neck these rings are more numerous and still more so on the head, where the rings become more whitish and produce a more grizzled appearance. The throat is snuff brown, the upper side and tip of tail black.

In the R. Swedish Nat. Hist. Museum are kept some Marsh Mongooses collected by my friend, Mr. GUNNAR LINNELL at Cape Debundsha, Cameroon. These present a somewhat different type from that of TEMMINCK's *pluto* so that they cannot be referred to that race. The following measurements indicate the cranial dimensions of two specimens, to judge from the size, presumably male und female.

	♂	♀ (?) old.
Greatest length	117 mm.	108,8 mm.
Condylolncisive length	110 »	103,5 » ¹
Basal length	103 »	96 » ¹
Zygomatic breadth	55,6 »	54,5 »
Interorbital breadth	21,5 »	23 »
Least postorbital breadth	15 »	17 »
Length of nasals	24 »	—
Distance from orbit to gnathion	40 »	36 » ¹
Palatal length from gnathion	60,2 »	56,5 » ¹
Palate breadth outside p^4 (posteriorly)	35,2 »	33,8 »
Combined breadth of upper incisors	13 »	—
p^3	6,5×4,2 »	6,4×4,2 »
Longest diameter of p^4	10,9 »	11,2 »
Length on outer side of p^4	9,8 »	9,4 »
Transverse diameter of p^4	7 »	7,1 »
m^1	9,2×7 »	9,6×6,3 »
m^2	6,1×3,7 »	6,4×3,7 »
Back of m^2 to front of canine	40 »	38 »
Length of lower jaw	76 »	—

A small p^1 is present on both sides in the male skull, in the presumed female it is present on one side, but has probably been lost on the other side as the diastema is

¹ The animal has apparently in lifetime lost the upper incisors except one of the lateral ones, and the alveoles are abolished. This measurement is therefore possibly a little too short.

rather wide. Both specimens have a well developed *crista sagittalis*, and the presumed female is old with obliterated sutures. The upper canines are keeled in front and behind, but by far not provided with such trenchant edges as TEMMINCK's *pluto*. The greatest antero-posterior diameter is 6 mm., and the whole tooth considerably more slender than in *pluto*.

From the measurements may be seen that the Cameroon Marsh Mongoose has a longer skull, but smaller carnassial and m^1 than *pluto*, especially the inner heel of the latter is much broader in *pluto*. The teeth of the lower jaw are also smaller than in *pluto*. The transverse diameter of m_1 of *pluto* ♂ is 6,2 mm., while that of the Cameroon Mongoose is 5,5 mm. The transverse diameter of p_3 is in the former 5 mm., in the latter 4,4 mm. and so on.

The Cameroon Mongoose has a small p_1 present in both specimens, but neither of the *pluto* specimens is provided with such teeth in the lower jaw.

The colour of the Marsh Mongoose from Cameroon is also different. The long hairs are black with short subterminal rings of a buffish colour and very broad subbasal whitish rings which are concealed. The animals therefore look very dark. The colour of the under fur is brown most similar to »sepia» (DAUTHÉNAY: Rép. de Coul. 300, 1—2). The head is grizzled by whitish rings on the blackish hairs. On the throat the rings are broader, more numerous and with a yellowish tinge. The limbs and feet are shiny brownish black. The tail is black, the long hairs without subterminal rings, but with the broad subbasal whitish rings which, however, are entirely concealed. The Marsh Mongoose from Debundsha, Cameroon, is thus so much different from TEMMINCK's *pluto* as well with regard to colour and pattern as to the skull, especially the teeth, so that it must be regarded as a different race. I suspected then that it might be identical with *Mungos naso* DE WINTON.¹ The journal, in which this has been described was, however, impossible to obtain in this country, and even my endeavours to secure it from abroad failed. Finally I took the liberty of sending a skull of our Cameroon Marsh Mongoose to Mr. OLDFIELD THOMAS who kindly has compared it with *M. naso* and found it identical with the same. According to my opinion *naso* must, although well distinct, rank as a subspecies to *paludinosus*, and the above description may serve to facilitate its identification in the future as the original diagnose appears difficult to obtain.

The skull of the Marsh Mongoose collected by Captain ARRHENIUS appears to have belonged to a female specimen, because the *crista sagittalis* is not very strongly developed, although the animal has entirely obsolete sutures and worn teeth. Its dimensions are as follows:

	Mongoose from Rutshuru ♀	
Greatest length	107,6	mm.
Condylolincisive length	99	»
Basal length	93	»
Zygomatic breadth	58	»
Interorbital breadth	18,2	»
Least postorbital breadth	18	»

¹ Bull. Liverpool Mus. III, 1901.

	Mongoose from Rutshuru ♀ (?)
Distance of orbit to gnathion	31,5 »
Palate breadth outside p^4 (posteriorly)	35 »
Combined breadth of upper incisors	13 »
Palate length from gnathion	56 »
p^4	7,3×6,4 »
Longest diameter of p^4	12 »
Length on outer side of p^4	9,8 »
Transverse diameter of p^4	8,7 »
m^1	10,7×7,5 »
m^2	6,3×3,3 »
Back of m^2 to front of canine	36,8 »
Length of lower jaw	70 »

There is no trace of any p^1 , nor of p_1 . The other premolars are comparatively large and heavy, much larger than those of *M. n. naso*. The upper canines are sharply edged on their posterior side, less so on the frontside.

The Rutshuru Marsh Mongooses looks reddish brown, this colour being produced by more or less rich rufous, fawn to rust red subterminal rings to the black long hairs which also sometimes have a whitish ring subbasally, or near the middle. The latter are concealed and also much less broad than in the Cameroon Mongoose. The underfur has a brownish colour like raw umber, but basally darker and more greyish. The head is grizzled with light rings to the dark hairs which are whitish on the sides of the head, more yellowish on top. The throat is yellowish grey, or somewhat ochraceous. Legs and feet brownish black. The tail is basally much mixed with rust red like the back, towards the tip the black predominates.

Length of the skin from snout to vent 565 mm. Tail without hair 295 mm. Hind foot (s. u.) about 88 mm. in a dry state.

This Mongoose from Rutshuru is evidently nearly allied to *M. paludinosus rubescens* HOLLISTER of East Africa. Whether it is fully identical, or not, is very difficult to say when not more material is available, and the faculty of variation of these Marsh Mongooses is imperfectly known.

The brain-cavity of this Mongoose appears rather large as it holds about 32 ccm.

Crossarchus zebroides LÖNNB.

A female specimen from Kasindi $\frac{6}{7}$ 1913.

It might perhaps have been expected that the Banded Mongoose of this district should be the Ruwenzori race *C. fasciatus macrurus* THOMAS, but this is evidently not the case. The tail of the present specimen is rather less than half the length of head and body. In this respect as well as with regard to colour and cranial measurements it agrees with the specimens from Mukimbungu, Lower Kongo, described 1908 by the present author.

Whether a quite young animal in milk-dentition, which has been collected at Beni in Jan. 1914, belongs to this species, or not, is impossible to say. It might perhaps be a young *Crossarchus dybowskii* POUSARGUES about which the author quoted says: »Sa robe en effet ne présente aucune zébrure». This holds good for the present specimen, but it may depend on its youth, as well as its generally dull colour may be attributed to the same cause.

Poecilogale albinucha doggetti THOMAS & SCHWANN.

1 ♂ $\frac{4}{4}$, 1 ♂ juv. & 1 ♀ $\frac{6}{5}$, 1 ♀ $\frac{9}{12}$, 1 ♂ $\frac{31}{12}$ 1913, all from Rutshuru.

The length of the skull of the largest male is exactly as great as that of the type viz. 60,5 mm. The relative length of the stripes is, of course, somewhat variable. The lateral stripes are, however, in none of these specimens two thirds of the length of the median one, as is said to be the case in the type specimens of *doggetti*. The white of the chin is in most of these specimens confined to the lower lip, and the white »patch on the throat» of the type is also absent in these specimens. These small differences are, however, of minor importance, and I do not hesitate to refer the specimens from Rutshuru to *P. doggetti* THOMAS & SCHWANN, the more so as the type locality of that form »Burrumba, Ankole» (Nkole) is not very distant.

In consequence of the variability thus found, *P. doggetti* apparently differs from the typical *P. albinucha* only by its very much larger size, and such a characteristic does not seem to be of more than subspecific value. It is probably due simply to more favourable natural conditions, and above all to more abundance of food.

Canis adustus.

A very large native flat skin. Length of head and body 83 cm.; tail 33 cm. The lateral stripes are well marked, and the tail very black.

Anomalurus jacksoni fortior n. subsp.

Two male specimens from Masisi near Kivu, Febr. 1914, and one from the forest west of Beni.

These specimens appear to agree with DE WINTON's description of *A. jacksoni* from Uganda with regard to the colour pattern, but they differ in some other respects. The author quoted says for instance that in *A. jacksoni* the rigid adpressed hairs »on the upper sides of the wings» are »confined to a small space barely 2 inches [= 50 mm.] long from the point of the expanding process backwards». In the largest of the present specimens these adpressed black hairs occupy a strip along the margin of the membrane of about 100 mm. from the process.

The dimensions of the largest specimen from Masisi are also larger than those of *A. jacksoni*, the distance from snout to vent being in the dry specimen about 400 mm.

(to base of tail 450), and the length of the tail without hairs about 220 mm.; the length of the dry ear 33 mm. The subcaudal scales are about 15; the proximal ones very large, measuring 12—13 mm. in length, but the most distal ones only about 3 mm.

Greatest length of skull 60 mm.; greatest zygomatic breadth 41,5 mm.; least width of nasals 6 mm.; height of infraorbital foramen 7 mm.; basal length of skull 53,5 mm.; upper molar series 13,7 mm.; diastema 13,3 mm.; mandible inside of incisors to condyle 37 mm.; height of mandible to coronoid 22,5 mm.

These differences appear to indicate that at the localities mentioned above there is to be found a somewhat larger race than the typical one in Uganda. This is also in agreement with other similar facts, no doubt depending upon the fact that the conditions of life for the western forest animals already in Uganda are somewhat less favourable than in the upper Congo forests, through which circumstances a racial difference is produced.

Anomalurus pusillus THOMAS.

A female specimen from Masisi, Febr. 1914.

This specimen has a greater zygomatic width (32 mm.), but agrees otherwise with THOMAS's description.

Idiurus zenkeri kivuensis n. sp.

An adult and a young specimen from Masisi in the Kivu-district.

These specimens agree much more in their general characteristics with *Idiurus zenkeri* MATSCHIE than with *I. macrotis* MILLER. Especially the cranial dimensions differ from those of *I. macrotis*.

It was more difficult to decide, whether this *Idiurus* from the Kivu district could be regarded as identical with *I. zenkeri* from Cameroon, or not, although from a geographical point of view it did not appear much likely. To make sure about this I took the liberty of asking the author of the Cameroon species, Professor MATSCHIE, concerning the same, and I am very much indebted to him for valuable information concerning this matter.

The general colour of the upper parts of this *Idiurus* is »deep bistre» (DAUTHÉNAY, Rép. de Coul. 303, 1), because the tips of the fur has this colour, but basally it is dark fuscous grey which shines through here and there. The fur on the lateral membranes is dark brown, »sepia» (l. c. 300, 2), or perhaps better RIDGEWAY's »fuscous». On the interfemoral membrane the dark hairs are partly tipped with a pale shade of »deep bistre». The upper side of the fore-legs are like the back; that of the hind legs is darker, more like the interfemoral membrane in colour. Scattered over the back, but more numerous on the sacral region, on the sides and on the membrane there are to be seen very long and very slender whitish hairs which probably have a sensory function. The general fur on the back has a length of about 10 mm.

The chin is white. The lower side of the body is grey between »slate grey» (362, 1)

and »smoke grey» (363, 4). This grey is overlaid with a very pale shade of »deep bistre», produced by the tips of the hair. The lower side of the lateral membrane is paler than the upper, but darker than the belly. The hairs of the tail has about the same colour as the upper side of the membranes.

For comparison with this may be quoted the renewed description of the colour of *I. zenkeri* which Prof. MATSCHIE kindly has sent me in a letter, since the specimen had been better prepared and dried. »Der Rücken ist gelblich isabellfarbig, nur wenig gelber als Woodbrown in der Nomenclature of colours und hell föhrenholzbraun (Taf. 310, 1) bei OBERTHÜR und DAUTHÉNAY, Répertoire de Couleurs. Auf der Unterseite hat *I. zenkeri* eine deutliche gelbe Farbe, die ziemlich stark zwischen dem Grau hervortritt, ein helles Olivengelb, das an den Körperseiten ins gelblich Olivenfarbene übergeht. Nur auf der Brust ist das Grau etwas dentlicher.»

The *Idiurus* from Masisi is also larger than *I. zenkeri*. The hind foot of the former measures, claws included, 17,5 mm. and s. u. 16,5 mm., while in the original description of *I. zenkeri* we read: — — »Hinterfuss 15 [mm.]; — — —; Hinterfuss bis zur Vorderseite der vorderen Sohlenballenreihe 11» [mm.]. The latter measurement of the *Idiurus* from Masisi is in the present dry state 12 mm. while *I. zenkeri* was measured as an alcoholic specimen.

To judge from the skin the *Idiurus* from Masisi appears to have greater bodily size. The present adult specimen measures as skin about 95 mm. from snout to vent. The ear appears to have about the same proportions as in *I. zenkeri*.

The skull of the new form is also larger. It is unfortunately damaged as the occipital region behind *sutura lambdoidea* is missing, but without the same its length is 22 mm., that is just as much as the greatest length of the entire skull of *I. zenkeri*. According to a communication from MATSCHIE the distance from *sutura lambdoidea* to tip of nasals is only 19 mm.

It was of great interest to find that the genus *Idiurus* has a distribution which extends so far east as it hitherto was known only from Cameroon. This fact makes it probable that members of this genus inhabits the whole West African forest region.

***Aethosciurus ruwenzorii vulcanicus* THOMAS.**

2 ♂♂, 2 ♀♀ from Masisi near Kivu, Febr. 1914.

***Heliosciurus rufobrachiatus semlikii* THOMAS.**

5 ♂♂, 2 ♀♀ from Beni, Aug., Sept. 1914; 1 ♀ ibid., Jan. 1914.

***Heliosciurus rufobrachiatus arrhenii* n. subsp.**

3 ♂♂, 3 ♀♀ from Masisi near Kivu, Febr. 1914.

These Squirrels resemble *H. r. semlikii* from Beni, but differ from the same in being considerably darker and larger. The back, especially its posterior portion is strongly

overlaid with long glistening black tips to the hairs, which almost completely cover the narrow light rings from view. The flanks and the head as well are darker and less grizzled than in the specimens from Beni so that the whole animal looks darker and not so brownish as *H. r. semlikii*. The tail has very long black hairs, and the pure white tips are not so numerous as in the Squirrels from Beni. The rufous around the snout and on the feet and legs is of a richer rufous shade, varying between DAUTHÉNAVY's »burnt sienna» (Rép. de Coul. 320) and »indian chestnut red» (ibid. 333). Head and body (dry skin) about 31 cm., tail (without hair) about 30 cm., hind foot (s. u.) 55 mm.

	♂	♀
Greatest length of skull	58 mm.	58,2 mm.
Condylolincisive length of skull . . .	51,2 »	52 »
Zygomatic breadth	32,5 »	33,5 »
Nasals	18,5 »	19,2 »
Interorbital width	17 »	18 »
Upper molar series	11,1 »	10,9 »

The presence in the Kivu district of a darker race of this species than at Beni is an analogy to the from the Ruwenzori race differing *Aethosciurus ruwenzorii vulcanicus*, also found at Masisi.

***Heliosciurus rufobrachiatus pasha* SCHWANN.**

1 ♂ from Rutshuru, ²⁷/₆ 1914.

A specimen with the under parts dirty whitish, and the cranial measurements agreeing with those recorded by SCHWANN is referred to this species. It is very much smaller than the foregoing.

***Protoxerus stangeri centricola* THOMAS.**

1 ♂, 3 ♀♀ from Masisi, Febr. 1914; 3 ♂♂, 3 ♀♀ from Beni, Aug., Sept. 1914; 1 ♀ ibid., Jan. 1914.

In addition to these adult specimens the collection also contains a quite young male (from Masisi, Febr. 1914) in which the molars are not yet fully developed. This specimen is remarkable for its bright colours. The crown and anterior back is mixed black and ochre (DAUTHÉNAVY, Rép. de Coul. 313). On the posterior back and on the hind legs the ochre colour dominates completely, so that hardly any black is visible. The hind feet are rust red (318). Fore limbs, sides of neck and face grizzled black and white. The line of demarkation hoary grey. Tail cylindrical, not bushy, ochre-coloured at the base, the remainder with long white tips to the hairs almost completely concealing the black basal parts. Length of head and body 23½ cm., tail 20 cm.

***Paraxerus böhmi emini* MATSCHIE.**

♂ ♀ from Masisi, Febr. 1914; 3 ♀♀, 2 ♂♂ from Beni, Aug., Sept. 1914. A young specimen which has lost its label.

Paraxerus alexandri THOMAS & WROUGHTON.

1 ♂, Beni, $\frac{1}{7}$ 1914; 1 ♂, 1 ♀ *ibid.*, Aug., Sept. 1914.

Funisciurus carruthersi THOMAS & WROUGHTON.

1 ♂, Masisi, Febr. 1914.

This rare species was first described on two specimens from Mubuka Valley, Ruwenzori. Some few years later THOMAS described a new subspecies which he named *F. c. tanganyikæ*,¹ because it was collected at »Usumbura, N. end of L. Tanganyika». The latter is said to be »more suffused with ochraceous» and have forearms and hind legs »strongly suffused with ochraceous». This is not the case with this specimen, but on the other hand it agrees with the subspecies from Usumbura in having the »tail-hairs washed terminally with whitish, far lighter than their basal rings, while in *carruthersi* both proximal and terminal rings are of the same yellowish colour». The pale colour of the tips, or subterminal rings of the tail-hairs may, however, be the result of bleaching, and even if this is not the case, the specimen from Masisi is at most intermediate between the typical *carruthersi* and *tanganyikæ*, although it has been collected nearer Lake Tanganyika than Eastern Ruwenzori.

Funisciurus akka DE WINTON.

4 ♂♂, 4 ♀♀ from Masisi, Febr. 1914.

Graphiurus soleatus THOMAS & WROUGHTON.

1 ♀, Masisi, Febr. 1914.

THOMAS has recently stated² the existence of two species of *Graphiurus* in Upper Congo viz. *G. christyi* DOLLM. and *G. lorrainensis* DOLLM. from the Poko-district. The present specimen differs, however, from both by its larger ears, and by the same characteristic still more from *G. surdus* DOLLM., described from French Congo. From *G. lorrainensis* it differs also by its larger and differently coloured hind feet etc.

The description³ of *G. soleatus* THOMAS & WROUGHTON from Ruwenzori fits on the other hand very well to the Masisi Dormouse. In fact the cranial measurements recorded by the authors mentioned, agree perfectly with the corresponding ones of the present specimen. The dimensions of ear and hind foot are also similar. On the other hand the length of head and body, as recorded by the authors quoted, is only 79 mm., while the skin of the present specimen measures about 11 cm., but it may be stretched, and the former measurement perhaps rather small. It appears rather improbable that the cranial and other measurements could be so similar, but the body dimensions so different.

¹ Ann. Mag. Nat. Hist. (8) Vol. IV, 1909, p. 477.

² Ann. Mag. Nat. Hist. (8) Vol. XVI, 1915, p. 474.

³ Trans. Zool. Soc., Vol. XIX, Part 5.

The tail of the present specimen is »clubshaped» and may thus have been broken.¹ It is only about 60 mm. without the long hairs. The general colour above is brownish grey (darker than RIDGWAY's »mouse gray»), but on the middle of the back is a large brown patch, something between RIDGWAY's »snuff brown» and »cinnamon brown». The animal has thus been in the act of shedding its pelage, and the two colours represented indicate evidently the limits between which the colour varies at different seasons of the year. It must thus be taken cum grano salis when some species of this genus are described as grey, and others as »bright buffish brown», because both colours are subjected to great change.

? *Oenomys bachante unyori* THOMAS (vel nova subsp.).

1 ♀ from Masisi, Febr. 1914.

This specimen is rather young with hardly worn molars, and it is possible that this may explain its small dimensions, but it is perhaps still more probable, that it may represent a different geographical subspecies, smaller and darker than the one the name of which is written above. As there is only this specimen at hand, no definite opinion can be expressed for the present. The upper parts of the head and anterior half of the back are grizzled dark brown and yellowish, the posterior back dark rufous. This colouration is to judge from the description darker than in *Oe. b. unyori*. The bright rust-red of the snout extends to the eyes, but is darker posteriorly. Ears rufous. Lower parts white, washed with buff. Outer side of hind limbs paler rufous than the back. Hind feet buffy, fore-feet mixed with brown. Inside of hind limbs orange buff, but rather pale. Head and body (skin) 15,5 cm.; tail 14 cm. (thus comparatively shorter than in *Oe. b. unyori*), hind foot (dry) s. u. 28 mm. Skull: greatest length 31,5 mm.; condyloineisive length 29 mm.; zygomatic breadth 14 mm.; interorbital breadth 4,7 mm.; nasals 7 mm.; palatal foramina 6 mm., upper molar series 6,4 mm. The anteorbital plate is vertical.

Cricetomys.

Captain ARRHENIUS's collection contains a very interesting series of Giant Rats of this genus, viz. 10 specimens and an extra skull from Masisi, and a specimen from Beni. This series contains young and adult of both sexes, but even considering age and sex it is by no means uniform. Six of the specimens from Masisi,² and the one from Beni have a white belly with a sharp line of demarcation, one specimen from Masisi has a whitish belly, but no sharp line of demarcation, the remaining two specimens from Masisi are dark-bellied.

The first mentioned ought to belong to the *gambianus* group, to which quite a number of subspecies has been described from different parts of Africa. To the West African subregion belong: *C. g. poensis* OSGOOD from Fernando Po, *C. g. dolichops* OSGOOD from Gaboon, *C. g. dichrurus* OSGOOD from Southern Nigeria, *C. g. liberiae* OSGOOD from Liberia,

¹ Conf. THOMAS in Proc. Zool. Soc. II, 1905.

² A seventh is a young male about which it is uncertain to which group it ought to be referred.

C. g. emini WROUGHTON from Mombuttu, *C. g. proparator* WROUGHTON from Ruwenzori, and *C. g. olivie* DOLLMAN from Northern Nigeria. It seems that among such a number of descriptions some would be applicable to these specimens. This appeared the more likely as THOMAS recently has referred Giant Rats from Upper Congo to two of the above mentioned subspecies viz. *C. g. emini* WROUGHTON and *C. g. dichrurus* OSGOOD. It could thus be expected that the above mentioned seven specimens possibly belonged to the subspecies just mentioned. A comparison with the original descriptions reveals, however, several differences, and it appears therefore the best plan to give a full description of two typical specimens (numbered 151 and 152 in Captain ARRHENIUS's collection), and then discuss the matter more fully. These two specimens (♀♀ ad.) selected are so similar inter se and with the others with regard to the colour that they can be described with the same words. The only exception is that one adult female among these six appears to have the fur somewhat more worn and a little more bleached than the others. The remaining four specimens are younger animals.

The two selected specimens may be described as follows.

Fur rather harsh, 12—13 mm. long on back, single hairs even reaching 15 mm. Colour of back very dark brown, most similar to DAUTHÉNAY's »warm sepia», but the hairs are very glossy. The fur is basally rather dark grey. On the flanks the colour changes rather abruptly to paler brown which on the lower flanks is rather light »cinnamon» (DAUTHÉNAY, Rép. de Coul. 323, 1). Between this colour and the pure white under parts is a very sharp line of demarcation. Upper parts of head and snout like the back, this colour surrounds the eyes; sides of head paler, like the upper parts of the flanks. A rather large white spot behind the vibrissæ (this spot is larger in »n:o 152» than in »n:o 151»). The upper parts of the hands and the feet very dark like the back, the outer, or sometimes both sides of the hands margined with white as also is the case with the inner side of the feet; fingers and toes white. The outer half, or less, of the tail whitish.

Length of head and body (skin) of a female with rather worn teeth about 38 ½ cm., tail about 37; hind foot 6,6 cm.

	♀ ¹ (molars little worn)	♀ ² (molars worn)
Skull: Greatest length	75 mm.	72,3 mm.
Condylbasal length	72 »	67,7 »
Zygomatic breadth	34,2 »	32 »
Nasals	31,7 »	29,2 »
Least interorbital breadth	11,4 »	11,4 »
Diastema	24 »	23,5 »
Palatal foramina	8 »	9 »
Upper molar series	12,5 »	10,7 »
Breadth of <i>m</i> ¹	3,9 »	3,2 »
Greatest breadth across the palate measured outside <i>m</i> ¹	15,0 »	13,3 »
Breadth of posterior choanae	6,5 »	5,5 »

¹ N:o 151 in Capt. ARRHENIUS's collection.

² N:o 152 in Capt. ARRHENIUS's collection.

The difference in the cranial measurements of these two female specimens, which with regard to colour are so similar as possible, is very peculiar. It would be only natural that the dimensions of the molars were somewhat smaller in the older specimen (n:o 152) in which these teeth are more worn than in the younger (n:o 151), but the difference appears in this case far too great, if it is considered that in the oldest, small-toothed specimen the inner cusps of the upper molars are not yet obsolete by wearing. Another absolute proof that the different size of the molar series is not only due to difference in age is offered by the fact that the length of the upper molar series of two other specimens (n:o 155 & 158) the same kind only measures 104 mm., although the specimens in question are so young that the inner cusps hardly are worn at all, and the molar series thus absolutely not shortened by wearing. The different length of the molar series becomes by these facts of distinctive value. The upper incisors are also very much broader and stouter in the specimen (n:o 151) with the larger molars so that the combined breadth of both incisors just above the cutting edge amounts to 6 mm., while in the other specimen (n:o 152) it is 4,8 mm. In the latter they have the usual chisel-shape, but in the former they are much more transversely worn off, so that the edge is blunt. This latter fact may be due to individually different food, or gnawing on different material (conf. below). This specimen with large teeth has also a very thick preorbital portion of the skull the transverse diameter of the premaxillary region being 13 mm. which is much more than in any other of the present specimens. In the other female skull, the measurements of which are recorded above, the same dimension is 11 mm. The height of the skull at the anterior end of the palatal foramina is resp. 8,8 and 7,2 mm. In connection with the large teeth the musculature of the jaws must be well developed which also produces a very broad and heavy zygomatic arch. The antero-posterior length of the zygomatic plate measures 7,6 mm., while the same dimension in the small-toothed specimen is 6,3 mm. The posterior margin of the palate is in the small-toothed specimen more evenly rounded, but in the large-toothed somewhat angular or notched.

These differences in cranial structure and dimensions between these two *Cricetomys* skulls are so great, that it appears quite impossible to refer them to one and the same race in spite of the facts that they have been collected at the same place, and that the skins are so alike in colour, the only difference readily perceptible being that the white spot on the upper lip is a little smaller in the big-toothed specimen. The white terminal portion of the tail is also shorter in the same, but it is not excluded that the tail has been mutilated in lifetime.

OSGOOD has suggested¹ that »the small-toothed forms of West-Africa are distinct from the large-toothed ones of East and South Central Africa». This is a conclusion drawn from the fact that *C. g. emini* (a large-toothed form) is found at the same locality as *C. g. dichrurus* (a small-toothed form) in Northern Congo.

The question is now whether the present large-toothed animal can be referred to *C. g. emini*, or not. To judge from WROUGHTON's short description, the hairs of *C. g. emini* are »greyish white, with apical third brown». This is certainly a quite different colour than the one possessed by the present specimen. The cranial dimensions are also

¹ Ann. & Mag. Nat. Hist. (8) Vol. V, 1910, p. 281.

somewhat different. *C. g. emini* has not quite as large teeth as this one, but larger palatal foramina. It is, however, possible that the smaller size of the molars of the type is due to wearing, and the other characteristics variable, therefore I will not deny that this specimen may possibly belong to the race named *Cricetomys gambianus emini* WROUGHTON.¹

Still greater difficulties arise for the identification of the small-toothed specimens, which are five in number, not counting an extra skull. With regard to colour they agree on the whole very well with *C. g. dolichops* OSGOOD. The latter appears, however, to have a longer and differently shaped skull with a very elongate preorbital portion resulting in much longer nasals and diastema. The palatal foramina are very short in *dolichops*, only measuring 7,5 mm, although the type was an adult male.

From *C. g. dichrurus* OSGOOD, which also is small-toothed, the Masisi specimens differ sharply by their pure white belly. The type of *dichrurus* was an »adolescent female», and therefore the cranial measurements recorded by OSGOOD cannot be directly compared with those of a fully adult specimen such as that from which the above recorded dimensions have been taken. To throw some light on the gradual development of the skulls the following series of measurements is added.

	♀ »n:o 155»	♀ »n:o 158»	»n:o 153» ²
Greatest length of skull	58,2 mm.	62,5 mm.	70,3 mm.
Condylbasal length of skull	54,5 »	58,5 »	67,7 »
Zygomatic breadth	27 »	26,8 »	31,5 »
Nasals	22 »	22,2 »	28 »
Least interorbital breadth	9,8 »	9,4 »	10,2 »
Diastema	17,3 »	19 »	22 »
Palatal foramina	7 »	7,5 »	8,2 »
Upper molar series	10,4 »	10,4 »	11 »
Breadth of <i>m</i> ¹	3,2 »	3,2 »	3,5 »
Transverse diameter of preorbital portion	9 »	8,5 »	10,4 »

These measurements prove that the preorbital portion of the skull with nasals and diastema are even comparatively speaking shorter in the young than in the adult. OSGOOD's »adolescent female» of *dichrurus* has consequently not yet attained full size in this respect, and the diagnose must thus be read with regard to this fact. The thickness of the preorbital portion of the skull appears to increase rather irregularly, or to vary individually.

C. g. dichrurus is said to have »extremely small bullæ». The specimens of this collection prove that the bullæ of the small-toothed race certainly are less inflated than those of the large-toothed *emini*-group. »Extremely small» is, however, too strong an attribute for the bullæ of the specimens now in question.

¹ From *C. g. proparator* WROUGHTON it differs in having hands and feet dark, and less white on the tail, dark under fur etc.

² No skin!

Even if the cranial dimensions as far as is known and for reasons mentioned above do not give any sharp distinguishing characteristics I feel compelled to regard this small-toothed, white-bellied *Cricetomys* from Masisi as a new subspecies which I call:

Cricetomys gambianus kivuensis, because the type locality is situated only three days march from the Lake Kivu. As type I select n:o 152 of Captain ARRHENIUS's collection, an adult female, which has been described above as well to its colour as cranial dimensions.

Cricetomys sp.

The above mentioned *Cricetomys* specimen («n:o 150» of the collection) from Masisi in which there is no sharp line of demarcation is a male belonging to the large-toothed group. With regard to its exterior it differs in the following points from the female («n:o 151»), which in the above with doubts has been referred to *C. g. emini*. The line of demarcation is not sharply defined, and the under parts are not so pure white, but somewhat tinged with buffish except on the throat. The back is not quite so dark, and the cinnamon of the flanks is more developed. The small white spot on the upper lip is also tinged with light cinnamon. The dark and light portions of the tail are about equal in length. The upper parts of hands and feet as in the *emini*(?) female very dark, »warm sepia», but with light margins and white digits and toes.

The skulls have partly very similar dimensions:

	♂
Greatest length	75,2 mm.
Condylbasal length	71,8 »
Zygomatic breadth	34 »
Nasals	31,0 »
Least interorbital breadth	10,4 »
Diastema	24 »
Palatal foramina	8,4 »
Upper molar series	12,3 »
Breadth of m^1	3,8 »
Greatest breadth across the palate outside m^1 . .	14,3 »
Width of posterior choanæ	5,6 »

In other respects, however, the skulls of this male specimen and that of the female »*emini*» differ from each other. The preorbital portion of the former is more compressed so that its transverse diameter is only 11,5 mm. against 13 mm. in the latter.

	♂	♀ » <i>emini</i> »
Width across outer sides of m^1	14,3 mm.	15 mm.
» » » » » m^3	13,0 »	14 »

The palate is thus broader in the female. The upper side of the skull looks very different in these two specimens. That of the female (»*emini*»?) appears much broader than the other. Its nasals are broader, almost equally broad for the greater part of their

length, whereas in the male they taper evenly to the posterior end. The raised lines on the frontals are erect and converge rather strongly in a forward direction so that in the anterior part of the frontals they are situated entirely on the upper surface, remote from the lateral wall of the skull, which in the anterior part of the orbit is rounded off towards the roof of the skull. In the female (*semini*?) the corresponding raised lines form almost horizontal crests protruding rooflike over the lateral wall of the skull.

The fronto-parietal suture is in the male straight and quite transverse, in the female it is semicircular, but this is no doubt a variable characteristic. The shape of the interparietal appears also to vary a great deal in this genus, as I have observed on the material of *C. g. kivuensis*, where it is sometimes more, sometimes less broadly triangular, or even somewhat rounded off on the anterior side. The relative size seems, however, to be about the same within the racial limits. For this reason it may be mentioned that in the male skull, now described, the interparietal bone is comparatively very small, measuring 4,7 mm. in length by 6 in breadth. In the *semini* female the same dimensions are 5,8 and 9 mm.

This comparison proves that, although a number of cranial dimensions are very similar, or almost identical, these two specimens in other respects present so great differences, that it is impossible to unite them within the same subspecies. There are thus to be found, as far as can be understood from the present material, not only a small-toothed and a large-toothed race of light-bellied *Cricetomys*-forms in the same district at Masisi, but there are even two different large-toothed forms. The great faculty of variation displayed by the genus *Cricetomys* is illustrated by these facts. Although I do not think that this specimen can be referred to any described subspecies I refrain for the present to name it, because only one specimen is available.

***Cricetomys gambianus proparator* WROUGHTON.**

1 ♀ from Beni collected 6/7 1913.

This specimen agrees on the whole very well with WROUGHTON's description with regard to colour and cranial characteristics. The differences may chiefly be due to individual, or perhaps seasonal differences. These differences are as follows. The fur is not 15, but hardly more than 12—13 mm. long, single hairs perhaps a little longer. It is grey not greyish white at the base. The hind feet are not entirely white, but brown in the middle of the upper side. The length of the hind foot of this dry specimen is not quite 68 mm.

The cranial measurements do not present any difficulties for the identification.

Greatest length of skull	76,7 mm.
Basilar » » » 	64 »
Condylolncisive length of skull	72 »
Zygomatic breadth of skull	32,5 »
Nasals	31,2 »
Palatal foramina	8 »
Diastema	24 »
Interorbital breadth	11,3 »
Upper molar series	11,3 »
Greatest breadth of <i>m</i> ¹	3,4 »

The fact that the premaxillary suture cuts the palatal foramina at their posterior extremity appears to be a good characteristic, as it is not found in any of the other specimens of the present collection.

Cricetomys microtis n. sp.

2 ♀♀ from Masisi, Febr. 1913.

A dark-bellied Giant Rat with large skull and medium-sized molars.

Colour on the back very dark brown, similar to DAUTHÉNAY'S »warm sepia» (Rép. de Coul. 305, 4). The fur is dense, rather harsh; on the posterior back, where it is longest, the average length is 15 and many hairs even 17 mm. It is dark grey at the base. Towards the sides the colour is more greyish brown, because pale »snuff brown» (Rép. de Coul. 303, 1) hairs are mixed with dark brown, the latter become gradually less numerous on the flanks so that the colour there is lighter greyish brown. There is no line of demarcation towards the under side, which is grey with whitish tips to the hairs. Hands and feet dark brown, »warm sepia» in the middle, somewhat paler on the sides, and on the toes and fingers. Only the distal third of the tail light coloured. On the upper lip behind the black vibrissæ is a greyish spot.

Head and body of an adult female about 42 cm. (measured on the dry specimen); tail about 38 cm.; hind foot (dry) about 70 mm.; ear (softened and stretched to natural shape!) 25 mm.

The other female has a somewhat more worn and bleached pelage, and it is therefore partly paler except where the new hairs are developed.

The dimensions of two skulls (both of fully adult females) are as follows:

	♂	♀
Skull: Greatest length	77 mm.	74 mm.
Condylobasal length	73,5 »	71,2 »
Condylolnsive length	71,3 »	69,6 »
Zygomatic breadth	34,4 »	32,7 »
Nasals	32,3 »	29,6 »
Least interorbital breadth	10,3 »	10,5 »
Diastema	24 »	25,0 »
Palatal foramina	9,1 »	9 »
Upper molar series	11,5 »	10,5 »
Breadth of m^1	3,5 »	3,6 »
Greatest breadth of palate measured outside m^1	14 »	13,7 »
Height of skull at anterior end of palatal foramina	14 »	13,8 »

In most respects these measurements agree, but there are also discrepancies. The longer diastema in the smaller skull corresponds with its shorter molar series.

Another difference which is rather striking consists in the fact that the larger skull in which the upper incisors are worn rather blunt, has much broader and more massive

upper incisors than the other skull, the combined breadth of both at the lower edge being in the former 5,4 mm., in the latter 4,5 mm. The antero-posterior diameter of an upper incisor above the worn surface is in the former case 4 mm., in the latter only 3,2 mm. This proves that the difference in size is not confined to one dimension only. The difference is, however, probably not fundamental, but due to the more intensive wearing of the larger teeth caused by gnawing on some hard material. The incisors of these animals appear during their continuous growth to become larger with age as in the series of *C. g. kivuensis* the younger animals have narrower incisors than the older. But if this is the case, a very intensive wearing of the incisors by gnawing on hard material may in one individual at an earlier age produce broader and stouter incisors than in average individuals, which have not subjected their incisors to the same degree of wearing. Consequently two individuals of the same age may have incisors of different size due to difference in wearing.

The frontal processes of the premaxillary extend rather far backwards, almost as far as the nasals. The raised lines on the frontals are well developed, vertical and not converging at their anterior ends. The interparietal is rather small, measuring about 9 mm. transversally, and about 5 mm. longitudinally. Bullae rather small.

The great variability of these Giant Rats makes it rather risky to create new forms, but in this case it appears evident that a rather well defined species has been found. It is easily recognized on its comparatively very small and rounded ears, its general colouration etc. The dark-bellied *C. ansorgei* THOMAS from Angola has much larger ears (47 mm.), and larger molars (length of upper molars 12,1 mm.), and it appears also to be much paler (»drab brown»). *Cricetomys gambianus elgonis* THOMAS has also much longer ears (42 mm.) and fingers and toes white and »tail dark for about one third its length».

***Thryonomys rutshuricus* n. sp.**

Two specimens from Rutshuru (one ♂, the other unsexed, skin somewhat mutilated), 18th of June 1914.

This new species is very easily recognized on its big skull and on its very short tail which latter measures only about 75 mm. from anus to tip. Its length is thus contained more than six, or practically seven times in the length of the head and body, which is about 520 mm., and the tail is shorter than the greatest length of the skull, which is 99,5 mm. (with a basal length of 85,5 mm.).

For comparison may be mentioned that in *Th. swinderianus* TEMMINCK, or perhaps more correctly, in the specimens recorded in the literature under this probably collective name, the length of the tail is stated to be contained from hardly more than two, to at most four times in the length of the head and body.

In VON HEUGLIN'S »*Aulacodus semipalmatus*» the tail is about half the length of the body (= head and body), »von halber Körperlänge».¹

¹ Verh. d. K. Leop. Akad. d. Naturf. 1864, p. 7.

In the adult »*Aulacodus calamophagus*», according to POUSARGUES,¹ the length of head and body is 60 cm., while the tail measures 21 cm., and in a young animal of the same kind the corresponding dimensions are 47 cm. and 18,5 cm.

In the type specimen of *Thryonomys sclateri* THOMAS from the Nyika plateau, the tail unfortunately was mutilated, but its remaining length amounted to 110 mm. It is thus already by this distinct enough, but still better by its small skull which only had a basal length of 69 mm.²

Concerning *Thryonomys gregorianus* THOMAS it is not with full certainty known how long tail it has, but as from the same »region» in which the skull, on which this species was based, a short-tailed *Thryonomys* skin has been obtained, it is probable that this belonged to *Th. gregorianus*. It should then have a tail »scarcely longer than the hind foot» (THOMAS l. c. 1897). *Thryonomys gregorianus* has, however, a very much smaller skull with the basal length only amounting to 72,7 mm. It can thus not be identical with the animal from Rutshuru.

It remains then *Thryonomys harrisoni* THOMAS & WROUGHTON from the Lado district. This species as well has been based on a skull together with an imperfect skin and nothing has been communicated about the length of its tail. The skull of *Th. harrisoni* is, however, much narrower than in the form from Rutshuru, the greatest breadth of the skull being in the former only 52 mm., in the latter at least 61,5 mm. In addition to this the postorbital process is »entirely absent» in *Th. harrisoni*, but pretty well developed in the Rutshuru form so that in the latter a very pronounced notch is produced between this process and the supplementary process on the squamosal.

Although plainly distinct from the species mentioned, the species from Rutshuru with regard to its upper incisors appears to be more allied to the *gregorianus* group than to *swinderianus*. The part of the incisor outside the outermost groove measures in the Rutshuru form about 2—2,3 mm., the following space to the second groove about 1,3 mm., and the third about 0,8 mm.; the fourth, or innermost is very narrow only about 0,3 (or 0,4) mm. These dimensions are a little variable, but the part of the tooth outside the outermost groove is plainly less than the remaining portion, although at the same time much broader than the next section.

The dimensions of the two skulls are recorded in the following tables. The larger which is known to have belonged to a complete male specimen is to be regarded as the type of the species.

The stiff and bristly hairs are as usual flattened and grooved on the upper surface. Their concealed parts are grey, the outer parts darken from brown to black towards the tips. The majority of the hairs are provided with buff subterminal rings. On the head and anterior part of the back these rings are less broad, and less numerous, their colour being »yellowish buff» (DAUTHÉNAV, 310, 2). On the posterior back they are broader and more dominating, and the colour richer, almost inclining to »ochre» (DAUTHÉNAV, 313). On the flanks they are much paler, yellowish white. Belly and throat »maize yellow» (DAUTHÉNAV, 36, 2 or 3). Lips and chin white, surrounded by maize yellow. In-

¹ Bull. Mus. d'hist. Nat. Paris, 1897, p. 160.

² Proc. Zool. Soc. 1897, p. 433.

side of hind legs maize yellow (36, 4). Anal region saturated yellowish buff (310, 4). The sealy tail is scantily beset with rather short hairs which are blackish above, whitish beneath, and do not cover the scales. The whiskers are mostly dark brown. The feet are covered with hair, mixed blackish and maize yellow.

		♂
Greatest length of skull	95 mm.	99,5 mm.
Basal length of skull	80,5 »	85,5 »
Greatest breadth of skull	61,5 »	61,7 »
Length of nasals	30,0 »	36 »
» » frontals	29 »	27,0 »
Interorbital breadth	32,5 »	(?)28,2 »
Greatest width of rostrum posteriorly across premaxillaries	27,2 »	28 »
Posterior breadth of nasals	16 »	16 »
Upper molar series	16 »	16,5 »
Lower » »	17,6 »	17,7 »
Tip to tip of postorbital processes	36,2 »	36,2 »
Diastema	23 »	24 »
Palate length to »henselion»	39,0 »	42,5 »

Dendrohyrax dorsalis FRASER.

A fine specimen from Beni caught 6th of July 1913.

Whether a small young without dorsal spot belongs to this species, or not, is impossible to decide.

Elephas africanus cottoni LYDEKKER.

A foetus with a length between forehead and vent amounting to about 30,5 cm. (Pl. IX).

As has been pointed out before, also by the present author concerning *E. a. cyclotis* MATSCHIE, the Elephant foetus comparatively early assumes the shape of the fullgrown animal to such a degree that the racial characteristics become conspicuous. This holds good also in this case. The shape of the ear proves that this foetus belongs to the race which has been named as above. A comparison between the accompanying figure of the left ear of this foetus shows exactly the same shape as LYDEKKER's figure in Proc. Zool. Soc. London, 1907, I, p. 390, on which the author quoted based his diagnose of this race. The shape of the ear, especially the small size of the hanging lappet may also be seen on a photo of a male Elephant shot by Capt. E. ARRHENIUS.

The ear of *E. a. cottoni* is less oval than that of *E. a. cyclotis* MATSCHIE from Cameroon, but undoubtedly both are nearly allied. Both have another characteristic in common viz. four hoofs on the hind foot. The present author stated¹ the presence of a fourth

¹ Comptes Rend. du 6me Congrès Internat. de Zoologie, Berne 1904, p. 324.

hoof in the hind foot of the foetus of *E. a. cyclotis*. This foetus of *E. a. cottoni* exhibits the same feature as can be seen on the plate (Pl. IX).

Generally it is stated in the textbooks that the African Elephant unlike the Indian only has three hoofs on the hind foot. LYDEKKER says,¹ however, quite correctly, that there may be either three or four broad flat nails in the hind limb of the African Elephant. The presence of four hoofs in the hind feet is evidently a more primitive characteristic than the reduction of these organs to three. In a similar way the oval or rounded ears of the races *cyclotis* and *cottoni* must be regarded as representing a more primitive stage

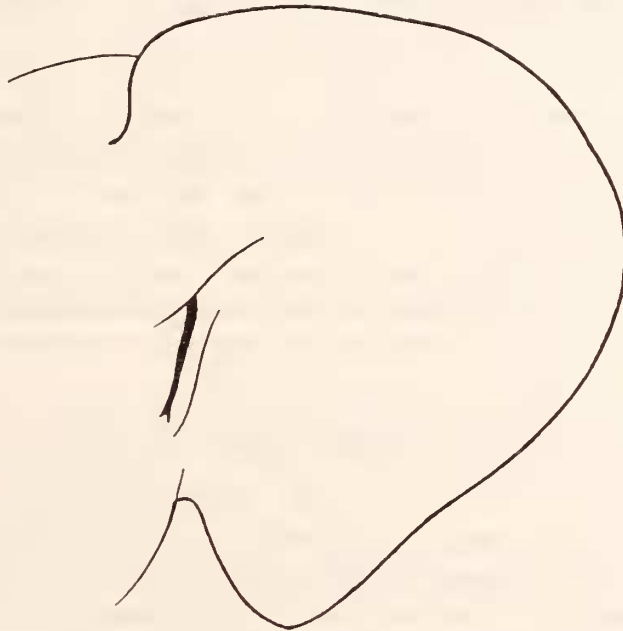


Fig. 6. Left ear of foetus of *Elephas africanus cottoni* LYDEKKER.

than the ears of certain South- and East-African Elephant-races with much enlarged more or less pointed lappets which hang down far below the lower end of the line of insertion of the ear. Compared with other African Elephants the two races which belong to the West African region display thus at least two primitive features in common.

Judging from a skull of an Elephant killed at the south end of the Albert Nyanza LYDEKKER has expressed² the opinion that this Elephant, which the author quoted has named *Elephas africanus albertensis*, is »the most generalized representative» of African Elephants. The relation between *E. a. albertensis* and *E. a. cottoni* does not appear, however to be quite clear as the former name is based on the skull, the latter on the ear, and both may be identical, in which case *albertensis* has priority. As I have been obliged to base my classifying only on the ear I must for the present, however, use the name *cottoni*.

The general appearance of this foetus is well illustrated by Pl. IX.

It is not hairy except in four places, viz. on the proboscis, on the lower and upper lips, at the eye, and at the tip of the tail. On the proboscis the hairs are comparatively most numerous around the nasal opening. Along the ridge which on either side borders

¹ »The Game Animals of Africa.»

² Proc. Zool. Soc. London 1907, p. 403.

the posterior, proximally flat, distally concave posterior surface of the trunk there is a considerable number of hairs, but none on the posterior surface itself. On the anterior surface scattered hairs are found, chiefly growing in the transverse folds of the skin, which latter, however, extend across the lower surface, or posterior surface as well. On the proximal portion of the trunk the hairs are very few.

On the lower lip the hairs are, as the figure (Pl. IX) shows, very numerous. The greatest number of them are white, but some of the posterior ones are black. On the upper lip there are very few hairs, all small and black. The hairs at the eye form a longitudinal series on the upper eye-lid, but not at its margin, and four hairs on the lower eye-lid are also situated in a row about the middle of the lid. Thus they do not occupy the place of whiskers as is the case in the Indian Elephant foetus according to TOLDT J:r.¹ These hairs are comparatively long and apparently of sensory function.

At the tip of the tail the hairs grow on the narrow sides of the laterally flattened terminal portion. On the posterior side there are two rows of hairs, and one of these (the left) continues around the tip on the anterior edge of the tail-end. The other (the right) does not extend beyond the end of the tail. As K. TOLDT J:r describes in his interesting and carefully written memoir, »Über die äussere Körpergestalt eines Fetus von *Elephas Maximus*»,¹ the hairs do not grow single at the tail-end, but are arranged in small groups which in this case contain 2—4 hairs.

Otherwise the hairs are not developed as yet. The outer layer of epiderm is dark as usual, and has a tendency of peeling off in flakes. The hoofs or nails are lighter than the skin. The soles of the feet have already the peculiar structure which I could not help admiring when I saw it in the footprints of the Elephant which I had the good fortune of tracking in the northern wildernesses of British East Africa. It exhibits a very intricate, labyrinthic pattern of small winding and meandering furrows, which with narrow interspaces spin over the whole lower surface of the sole. It is rather difficult to describe this accurately, but the drawing of the foetus on the accompanying plate (Pl. IX) displays this pattern to some extent so that an idea of the same may be conceived. Undoubtedly this structure is of very great importance for the Elephant, as it prohibits him from slipping, when the elastic pads are stemmed against the ground by the weight of the animal.

BRAUER has stated² that already in a quite young (7,25 cm.) foetus of Elephant from Cameroon a »schon scharf hervortretende Perissodactylie» is to be seen and that the middle toe is much more strongly developed than the lateral. In this foetus as well the middle toe is largest both in front and behind. On the fore feet, however, the difference in size between the middle toe (the third) and the fourth is not great to judge from the size of the hoofs. The proportion of the hoofs is expressed by the following measurements of their breadth:

¹ Denkschr. d. Math. Naturwiss. Kl. d. K. Akad. d. Wiss. Wien 1913, Bd. XC.

² Sitzber. Ges. Naturf. Freunde, Berlin, 1910.

	Left fore-foot	Right fore-foot
I toe	5 mm.	5 mm.
II »	8 »	8,5 »
III »	11 »	11,5 »
IV »	10,7 »	10 »
V »	7 »	6,5 »

On the hind feet the perissodactylism is still better pronounced as follows:

	Left hind foot	Right hind foot
II	7 mm.	6,5 mm.
III	10,3 »	11 »
IV	8 »	7,6 »
V	4,5 »	5,1 »

The following dimensions of the foetus may be of interest for comparison with other ones:

Length of tail from anal opening	123 mm.
» » proboscis from mouth	141 »
Ear-opening to posterior margin of ear.	73 »
Greatest vertical height of ear from flap	101 »

Bubalus caffer radcliffei THOMAS.

3 skulls from Rutshuru.

The magnificent Buffaloes of the Rutshuru plains (fig. 6) belong very typically to the race named by THOMAS as above. The best skull, although not a record skull



Fig. 7. Buffaloes from Rutshuru shot by Captain ELIAS ARRHENIUS.

has somewhat larger horns than the type with a distance between the most distal points of their outer convexity of 1185 mm. The palms are not quite as broad as in the type being 260 mm. in a straight line. This bull is still in its prime with the molars not much worn. Length of molar series 147 mm.

Greatest breadth across orbits	255 mm.
Length of nasals	231 »
Least interorbital width	170 »
Orbit to tip of premaxillary	290 »
Greatest breadth across premaxillaries	114 »
Length of palate	319 »

These measurements are almost all of them larger than those of a Buffalo bull which I shot at Upper Guaso Nyiro in British East Africa, although that one was of the same general type and also must be referred to *B. c. radcliffei*. The difference is no doubt only due to the harder conditions of life for a big grazing animal in the dry country at Guaso Nyiro than at Rutshuru.

In their book »Life histories of African Game animals», Vol. I, ROOSEVELT and HELLER published a map (map 11 at p. 418) over the »distribution of the races of the African Buffalo». On this map the areas of distribution of the subspecies »*radcliffei*» and »*aequinoctialis*» are marked out. The western boundary line for the former race is there drawn well to the east of Rutshuru River and excludes thus the Rutshuru plains which are laid to the area of *aequinoctialis*. This is, however, evidently a mistake as the present collections prove (efr. also the figure 7). The Buffaloes of the Rutshuru plains are true *radcliffei*. The horns of the skulls have a much more pronounced downward sweep proximally than the photo appears to indicate.

Damaliscus korrigum ugandæ BLAINE.

Two very fine specimens, male and female, from Rutshuru 26th of June 1914, and in addition to them a couple of skulls.

Both sexes are alike in colour.

Skull dimensions:	♂	♂	♀
Greatest length of skull	404 mm.	412 mm.	395 mm.
Condylbasal length of skull	386 »	396 »	381 »
Basal length of skull	365 »	375 »	359 »
Greatest breadth of skull	156 »	150 »	146 »
Length of upper molar series	90,7 ¹ »	99,5 »	95,5 »
Length of nasals		177 »	163 »
Length of palate		222 »	217 »
Orbit to gnathion		269,5 »	
Width of skull at first premolar		61 »	

The skulls of these specimens present an interesting feature with regard to their first premolars. This tooth has namely at its anterior end an appendix attached (Pl.

¹ Worn.

XII, fig. 3), which almost has the shape of such an accessory column as is to be found on the inside of the molars of certain Ruminants. This anterior column of the first premolar of these Antelopes is, however, not homologous with such accessory columns of the molars, but I consider it as a remaining rudiment corresponding to the anterior lobe of the tooth which is present in the milk-premolars, but usually entirely lost in the permanent premolar. In skulls of *Connochætes* and *Bubalis* which I have examined there is no such columnar appendix at the frontside of the first premolars, nor is there anything like that to be seen on the same teeth of a skull of *Damaliscus lunata*. This may thus be a characteristic of the *korrigum*.

Another striking characteristic of these skulls is found in the shape of the posterior choanæ (Pl. XII, fig. 3). This peculiarity consists therein that *laminae pterygoideæ internæ* some way behind *hamuli pterygoidei* are very strongly convex in the middle on their inner, and concave on their outer side. By this bulging inwards of the middle of the pterygoid walls of the choanæ, although the free brims of the same are turned out to the same width as anteriorly, the passage through the choanæ must be much obstructed. At the narrowest place this passage between *laminae pterygoideæ internæ* measures only 6 mm. and when in lifetime the bones are covered by the mucosa the interspace must be nearly blocked up. The inner breadth of the choanæ behind the palatal margin and to the *hamuli pterygoidei* is about 20—22 mm. The lower margins of *laminae pterygoideæ internæ* have an interspace behind the *hamuli* of about 27 mm., but this interspace decreases gradually in a backward direction to 16,5 mm. *Laminae pterygoideæ externæ* extend, however, beyond the *laminae internæ* and form the free margin. The distance between these free brims is about 31—32 mm. from behind the *hamuli* and continues for some distance beyond the place where the narrowest constriction between *laminae internæ* is situated, then it gradually diminishes to about 26,5 mm. and is 30 mm. at the posterior end of the choanæ. These measurements are from the largest of the male skulls the dimensions of which are recorded above.

In the skulls of *Connochætes* and *Bubalis* examined no such constriction of the choanæ has been observed, nor in *Damaliscus lunatus*, although the brim formed by *laminae pterygoideæ externæ* may be more or less turned out. Especially in the latter this is the case in a considerable degree.

The question then readily presents itself: what purpose does this strange shape of the posterior choanæ serve? The reply to this appears most probable to be that the shaping of the choanæ is a secondary product without certain aim, but that the primary thing is the strengthening of the pterygoid bones which serve for the insertion of *musculi pterygoidei*. This purpose is fulfilled not only by these bones being remarkably thick and solid, but also by their greater extension. The area of the bones is namely increased both by the concavity of the pterygoid wall and the turned out brim. The combination of these two conditions give the bony pterygoid wall a more solid construction and thus more power of resistance against the pull of the *musculi pterygoidei*, when these contract themselves. As these muscles are of great importance for the grinding of the food it is easy to understand that an increase of them is of importance for the animal when it has to masticate coarse food. Thus increased exercise of these muscles has been needed

for grinding the food of the *korrigum*. The museles have through this become gradually enlarged, and they have then secondarily influenced the growth and shape of the bones to which they are inserted.

***Cephalophus weynsi* THOMAS.**

An old female from the »montagne et forêt Kabwe, Rutshuru, le ²⁹/₃ 1914». An old female from Beni, Aug., Sept. 1914.

At Beni these Duikers were known under the name »Kurupa». There is not the slightest doubt that these two specimens correctly may be referred to the *C. weynsi* group, but on the other hand they are not quite identical, neither with regard to the pelage and its colour, nor with regard to cranial dimensions. It appears therefore most opportune to regard them as representing two different geographic races. The question is then to decide which one most probably ought to be taken as identical with the typical race, if any of them is. I am not quite certain about the last point, but there are several reasons, geographical as well as zoological, which make me inclined to regard the specimen from Beni as most likely nearest to or identical with the typical *C. weynsi*. The collecting locality near Beni lies somewhat west of that place and is situated in the great tropical Congo forest which extends to the Stanley Falls district, but on the other hand Kabwe at Rutshuru is at from the great Congo forest isolated mountain forest, which latter thus might be inhabited by somewhat aberrant forms. The description of *C. weynsi* as repeated by LYDEKKER¹ contains the statement: — »body-hair short and close» — and this suits the specimen from Beni much better than that from Kabwe. Still more important is that the basal length of the skull of the type of *C. weynsi* which still was young, »à prémolaires de lait en place» is recorded² to be 175 mm. which is almost identical with the same dimension (174,5 mm) of the old female from Beni, while that of the equally old female from Kabwe is only 166 mm. thus indicating a smaller race. It appears thus most suitable to distinguish the Duiker from the Kabwe forest with a third name as:

***Cephalophus weynsi rutshuricus* n. subsp.**

With regard to the colour of the head and neck this race resembles that of the *C. weynsi* in the great Congo forest as represented by the specimen from Beni, but it is generally darker. The neck is not quite so thin-haired as in the Beni-specimen, and its colour on the sides is somewhat more reddish brown. There are more black hairs on the anterior back and over the shoulders, than in the one from Beni, and behind the withers the colour shades from something between »madder brown» (DAUTHÉNAY, 334, 4) and »Indian chestnut red» (DAUTHÉNAY, 333, 4) on the back to »burnt sienna» (DAUTHÉNAY, 320, 1) on the hams and »brownish terra cotta» (322, 4) on the lower flanks, while the animal from Beni might be termed »rust red» (318, 1 & 2). The chest shows in both

¹ Catalogue of the Ungulate Mammals, Brit. Mus., Vol. II, p. 74.

² Ann. Mus. Congo, T. II, Fasc. 1, p. 15.

some dark shades in the middle without that any distinct ventral stripe, or patch is formed. All over the body the pelage is better developed and less close than in the Beni specimen. The legs and feet are darker in the specimen from Kabwe without, however, becoming black. Therefore the black stripe from the heel, as well as that of the front side of the tarsus¹ can be discerned in the dark brown general colour of the feet. The tail has basally the colour of the back, the tuft is black, mixed with white at the tip and on the lower side.

As far as these specimens mentioned above can be regarded as typical, it is very easy to distinguish the two races of *C. weynsi* already by their different colour.

The cranial differences may, however, be regarded as more important and those may be seen from the following table of measurements and the figs. 1 and 2 of Pl. X.

The horns of the specimen from Beni measure about 56 mm. (greatest diameter 17), those of the specimen from Kabwe 49—50 mm. (greatest diameter 16 mm). They are rather similar, with a bluntly conical tip followed by an indistinctly ringed portion on which more or less plainly about five transverse rugosities may be traced. The basal portion is somewhat depressed, or obliquely compressed. It has an uneven surface, but without rings.

At the same place and the same day (²⁹/₃ 1914) another specimen of Duiker was collected by Captain ARRHENIUS in the mountain-forest of Kabwe. This specimen which also is an old female differs so strongly with regard to colour from the one described above that at first I was inclined to believe it a representative of another race (perhaps *C. johnstoni* which is stated to be much darker than *weynsi*). A closer examination of the skulls of the two Kabwe Duikers revealed, however, that these with regard to their general appearance and dimensions were so alike that they could not be separated. This is very plainly proved by the following table of measurements. The only difference, which is worth mentioning, is that the length of the upper molar series is somewhat longer in the dark specimen. This is, however, very easily and naturally explained by the fact that the teeth in the first described specimen are more worn, indeed almost worn out, and therefore this dimension secondarily has become shortened. Judging from the likeness of the skulls I must thus refer the darker specimen as well to *C. weynsi rutshuricus*, and regard it as somewhat melanistic. This makes itself apparent by the general darkness which is produced by dark hairs mixed among the »red», or by black tips to some hairs. The whole of the fore quarters is thus a dark shiny brown, which gradually behind the shoulders is more and more enlivened by a sprinkling or grizzling with rufous. Thence it shades gradually from something like madder brown on the back, to a saturated rust red on the hams. Along the middle of the chest towards the navel is a broad band of »warm sepia» on the sides surrounded with a paler brown, somewhat similar to »burnt umber». The head and the legs are similar to the other specimen, only a little darker. The same is the case with the tail.

The horns of the melanistic specimen are of the same type as in the other, but more

¹ These stripes are present in a number of species of *Cephalophus* as f. i. *C. claudi*, *leucogaster*, *weynsi*, *johnstoni* etc.

depressed, and therefore with a greater transverse diameter amounting to 21 mm. basally at its maximum.

	♀ Beni ad.	♀ Kabwe ad.	♀ Kabwe ad. (melanistic)
Total length of skull	197 mm.	185,3 mm.	185 mm.
Basal » » »	174,5 »	166 »	164 »
Zygomatic breadth of skull	86 »	85 »	86,5 »
Breadth of brain-case	61 »	56,3 »	60 »
Distance from orbit to tip of premaxillary	107 »	96,5 »	96 »
Length of nasals	86 »	71,8 »	73 »
Least interorbital width	43,3 »	45 »	46,6 »
Greatest breadth of nasals (at lacrymal suture)	32,8 »	36 »	36,4 »
Width of nasals at nasi-premaxillary suture	18,4 »	21 »	24,5 »
Length of upper molar series (worn!)	50 »	47,5 »	54,5 »
Breadth of m^2	12,7 »	13,4 »	14,5 »

These measurements prove very plainly that *C. weynsi* from Beni has a considerably longer skull (Pl. X, fig. 1) with a more elongate rostrum than the Rutshuru race (fig. 2), while the latter is not only comparatively, but even absolutely broader in the nasal region. The nasals do not project mesially so far backwards in the Duikers from Kabwe as in that from Beni, nor are they so strongly produced forwards in their anterior end, but everywhere broader. These features prove that the Duikers from Kabwe are not simply smaller specimens of the same kind as that from Beni. Otherwise both skulls, of course, have a general resemblance. Characteristic to both is that the nasals are comparatively flat above, especially in the specimens from Kabwe, but that the central portion of the frontals, inside *foramina supraorbitalia* is rather strongly raised to form a pronounced convexity which in the specimen from Beni forms an almost roof-like ridge (Pl. X, fig. 1 & 2). The upper molar series are in both comparatively short, but the true molars broad.

On the lower jaw the angular flanges or lobes are very sharply set off (almost in a right angle) from, and extend about a centimeter below the lower contour line of *ramus horizontalis* (Pl. X). This great expansion of the angular portion of the lower jaw indicates that the diet of the animal requires a powerful development of the musculature of the jaws especially *m. masseter* and *m. pterygoideus internus*. The strongly worn condition of the molars, and the fact that the inner sides of the upper, and the outer sides of the lower molars are very much more worn down than the opposite sides prove that the food-material has needed an intense grinding activity before it became useful for digestion. Unfortunately nothing is known about the biology of these animals, but of all species of *Cephalophus* represented in this collection, *C. weynsi*, with its subspecies, appears to be the most specialized in this respect, and this as well as other structural features prove that the different species of this genus, although inhabiting the same districts must differ in a considerable degree with regard to their habits, diet etc.

? *Cephalophus johnstoni* THOMAS.

A young ♂ only with milk-dentition from Beni, Aug., Sept. 1914.

C. johnstoni was described¹ on a single young specimen from Toro, east of Ruwenzori, which still seems to be the only known in existence. The principal characteristics by which it should be distinct from *C. weynsi*, with which it shares the reversal of the hairs of the nape, should be its thicker fur, and much darker general colour. The first of these characteristics is found in this specimen as well, but as it is a juvenile feature, it does not prove very much. The second characteristic holds also good perhaps in too high a degree as the dark shining brown extends not only over the hind quarters, but also over the whole back almost to the root of the tail. The flanks and hams are not »deep reddish russet» but rather »burnt umber» (DAUTHÉNAY, 304, 1). With our present knowledge it is impossible to say, whether this is a perhaps somewhat melanistic young of *Cephalophus weynsi*, or of *C. johnstoni*.

Cephalophus claudi mixtus n. subsp.

1 ♀ from Beni, Aug., Sept. 1914.

»En Kiswahili Bengel« Capt. ARRHENIUS has written in his diary.

There is no doubt about a close relationship existing between this Duiker from Beni and *C. claudi* THOMAS & WROUGHTON from Bambili, Welle Basin, but as there are several differences noted below which are the more important as the type of *C. claudi* also was an adult female, I think it most correct to distinguish this form with a third, subspecific name.

The general body colour is chestnut rufous on the fore quarters, gradually passing through »burnt sienna» (DAUTHÉNAY, 320, 2) on the posterior back to »rust red» (318, 1) on the hams. A broad black blaze on the face from the muffle, including the tuft and still extending over the nape some way on the upper neck, where it gradually dissolves in the black sprinkling, which is to be seen over the fore-quarters. On the sides of the black blaze above and behind the eye there are many white hairs. A rufous superciliary band borders sharply the black blaze. Another rufous band goes through the glandular region to below the eye; the upper lips browner. Chin pale rust red. Throat and sides of neck rufous much mixed with white hairs; many scattered white hairs are to be seen on the shoulders as well. White hairs are still more numerous on the flanks where they decidedly are in majority but mostly covered by the longer red hairs. From the chest to the navel a blackish median band. The fore-legs are brownish black to the elbow, where the dark colour gradually dissolves in the black sprinkling of the shoulders, and on the inner side of the fore-legs a stripe of the body colour extends to the carpal joint. The hind feet are only blackish a little above the hoofs, but there is a broad black patch on the heel, and from there a narrow dark stripe runs down on the posterior side of the foot to the lateral hoofs, and another similar, but shorter stripe is found on the outer part of the front-side of the lower metatarsus. The tail is similar to that of the typical *C. claudi*,

¹ Proc. Zool. Soc., London 1901, p. 89.

basally of the body colour, then with whitish hairs, and finally the outer half with a great black tuft, which at the tip and its lower side has a »tendency to show white».

Total length of skull	182 mm.
Basal » »	164 »
Zygomatic breadth of skull	77,7 »
Distance from orbit to tip of premaxillary . . .	96 »
Length of nasals	67 »
Interorbital breadth (least)	37 »
Length of upper molar series	51,8 »
Greatest breadth of m^2	13 »
Length of bullæ	24 »
Breadth of palate outside m^2	55 »

If these measurements are compared with those of the type of *C. claudi*¹ it is found that, although the total length of both is almost the same (resp. 182 and 185 mm.), the length of the rostrum (102) and the length of the nasals (75 mm.) of *C. claudi* is distinctly larger than those of the present specimen. The latter approaches in these respects somewhat to *C. nigrifrons*, which, however, is much different in colour. The geographical neighbour *C. rubidus* from Ruwenzori has still shorter rostrum (85 mm.), and nasals (60 mm.), and it is also different in colour. The molars are not broad, but nevertheless broader than in the nearest related forms *C. nigrifrons* and *C. rubidus*.

The narrowness of the skull of the present specimen, and the flatness of its upper surface appears to be a rather striking characteristic. Another is the truncate posterior end of the nasals (Pl. X, fig. 3), which only show a slight convexity in the middle of the suture with the frontals. The preorbital pit is very deep and large. The premaxillaries are rather broad at their upper end. The bullæ are large, but extremely thin-walled (like paper!). *Foramina incisiva* are very large, measuring 27,5 mm. in length by 6,5 in breadth. The prædental portion of the palate is very narrow and constricted, measuring only about 18 mm. in breadth, and with a narrow edge along the median suture. The median posterior palatal emargination extends further forwards than the lateral ones and reaches almost to a line through the middle of m^2 . The lower jaw is also very slender (Pl. X, fig. 3), the greatest height of *ramus horizontalis* below m_2 being only 20 mm. The whole structure of the skull appears to indicate an animal feeding on tender vegetable matter (leaves and young shoots). The upper molar series is almost straight along its inner contour line, but converging forwards so that the distance between the inner sides of m^3 is about 32 mm. but between p^1 about 20 mm.

The horns (Pl. X, fig. 3) are short and blunt, greatest length 36 mm., greatest transverse diameter 14 mm. They are much worn on the upper surface by branches and twigs, when the animal sneaks through the undergrowth. To such a life undoubtedly also the narrowness of the skull is an adaptation.

Cephalophus leucogaster GRAY.

A young male with only the first molar developed from Beni, Aug., Sept. 1914, and an adult female from the same locality, Jan. 1914.

¹ According to THOMAS & WROUGHTON in Ann. Mag. Nat. Hist. (7), Vol. 19, 1907, p. 386—387.

The knowledge about the skull of this Duiker appears to be rather imperfect. THOMAS has recorded¹ the basal length and greatest breadth of »le plus grand crâne» out of two belonging to an adult pair ♂ & ♀. The former of these measurements was 161 mm., the latter 83 mm. The skull of the adult female in this collection has the following dimensions:

Greatest length	189 mm.
Basal length	167,5 »
Zygomatic breadth	86,5 »
Breadth of brain-case	58 »
Interorbital width	46 »
Length of nasals	76 »
» » rostrum from orbits	96 »
» » upper molar series	56 »
Breadth of m^2	13,5 »
Length of bullæ	27 »
Breadth of palate outside m^2	60 »

This skull is evidently somewhat larger than THOMAS's largest specimen.

The nasals are pointed behind in such a degree that their posterior portion which is embraced by the *processus nasales* from the frontals forms an equilateral triangle. Their upper surface like the whole forehead is flat, very different from that of *C. c. castaneus*, *weynsi* etc. (cf. Pl. XI). The median posterior palatal emargination is narrow, but reaches much further forwards than the lateral ones. The premaxillaries reach the nasals (Pl. XI, fig. 1).

In the young skull from the same place (with a total length of only 154 mm.) the posterior suture of the nasals is rounded off, but the *processus nasales* from the frontals project on both sides in a similar degree as in the adult. The posterior choanæ stand more broadly open in the young than in the adult. The molar series of the adult ♀ is not much curved, the distance between the inner sides of m^3 being about 35 mm., and that between p^1 about 26 mm.

The horns (Pl. XI, fig. 1) are rather slender, conical and sharply pointed.² Their length in the adult female is 50 mm., and their greatest diameter near the base is 11 mm. They are not worn on their upper surface. From this fact and the colour of the animal it may be assumed that this animal does not live in the thick forest.

The description of the colour of this species in the literature is not very complete, and it is thus connected with great difficulty to decide whether the specimens from Beni are quite identical with the typical form from Gabun. The latter is described as »dull chestnut rufous», but since THOMAS had had the opportunity of seeing adult specimens he adds (l. c.) that they are »un peu plus bruns sur la région antérieure du corps que le type encore jeune». These latter specimens were, however, from the Stanley Falls district,

¹ Ann. Mus. du Congo, T. II Fasc. 1.

² This is in agreement with the description of the type specimen in »The Book of Antelopes». The horns of this Antelope are thus very different from those of *C. ogilbyi*, although KNOTTNERUS-MEYER unites both into one of his many genera and says about the same: »Die Hörner sind, besonders beim Männchen, dick und gross.» (Arch. f. Naturgesch. 1907).

and it is perhaps not certain that they are of quite the same race as the type from Gabun. The above quoted cranial measurements have made it probable that the *leucogaster*-Duiker living at Beni is larger than the one of the Stanley Falls district.

The adult specimen of the present collection does not differ much from the young one, but has a little brighter colours on the sides of the anterior part of the body. The scapular region may be described as »otterbrown» finely grizzled with rufous, behind this the sides are »fawn» (DAUTHENAY, 306, 1 & 2) which gradually becomes brighter, almost »rustred» (DAUTHENAY, 318, 2) on the hind quarters at the sides of the black dorsal band. Down on the hams the colour gradually becomes lighter (318, 1), and finally it appears most similar to RIDGWAY's »pinkish cinnamon». A black band on the heel extends as a narrow dark streak to the outer of the lateral hoofs, and a similar dark streak is seen on the front side of the metatarsus.

THOMAS has kindly communicated in a letter that all specimens of *C. leucogaster* in the British Museum have a dark mark down the heel, and also that their fore-legs are a kind of pale ashy grey brown. Thus the colour pattern of these specimens appears to agree with the typical ones, and it depends then upon cranial dimensions, if *C. leucogaster* from Beni possibly constitutes a different race, which cannot be decided before adult skulls from the type locality have been described.

Cephalophus castaneus arrhenii n. subsp.

1 ♀ from Beni, Jan. 1914.

This specimen is no doubt related to *C. castaneus* THOMAS typically from Cameroon, but also described by the same author from Congo.¹ There are, however, differences as well with regard to cranial dimensions as in colour which are too great, and too important to permit an identification, the specimen of the present collection being much darker and much smaller, as may be seen from the following table of measurements.

	<i>C. c. arrhenii</i>		<i>C. castaneus</i>	
	♀ from Beni	♂ from Mukim-bungu	measurements recorded: by SJÖSTEDT	by THOMAS
Greatest length of skull	175 mm.	205 mm.	—	—
Basal length	154,5 »	176,5 »	170 mm.	179 mm.
Zygomatic width	76 »	90 »	85 »	90 »
From orbit to tip of premaxillary	88 »	105 »	99 »	103 »
Upper molar series	54 »	59,6 »	56 »	59 »

The considerably greater dimensions of *C. castaneus* become perhaps still more conspicuous if some other measurements of skull dimensions are compared. For doing so I have unfortunately only an adult male skull of *C. castaneus* from Mukimbungu, Lower Congo, for comparison, while the present female skull from Beni is still comparatively young as it has not yet changed its milk-premolars, but the third molar is already

¹ Ann. d. Mus. du Congo, T. II, Fasc. 1.

up in both jaws. Thus the increase in size between this stage and the fully adult cannot be expected to be very great, and therefore the measurements recorded below can be compared without being misleading.

	♀ Beni	♂ Mukim- bungu
Distance between alveolar margin of m^3 and orbit	24 mm.	32 mm.
Breadth across outside of m^1	52 »	61,5 »
Length of nasals	66 »	80 »
Greatest transverse diameter of m^1	10,2 »	15 »
» » » » m^2	10,3 »	16 »
» » » » m_1	6,4 »	9,4 »
» » » » m_3	6,5 »	10 »

The shape of the bones of the two skulls is in many cases very different. The anterior contour of the palatal bones of the skull from Beni forms an evenly curved arch extending forwards to a level with the anterior portion of m^1 , but in the *castaneus* from Mukimbungu it is a straight transverse (22 mm. long) line on a level with the anterior portion of m^2 , and the lateral sutures of the palatal bones form distinct angles with this anterior transverse suture. The posterior choanae are much narrower in the larger skull measuring on a level with the posterior end of m^3 only 8,7 mm., but in the smaller female skull from Beni the same measurement is 14 mm. This depends upon the fact that in the former the pterygoid laminae stand vertically, in the latter they diverge towards their lower margin.

The shape of the nasals is also very different. In the *castaneus* skull the posterior ends of the nasals project with a blunt point backwards between the *processus nasales* of the frontals, which latter are broadly truncate and form an almost straight transverse suture with the lateral portions of the nasals (Pl. XI, fig. 2). In the female skull from Beni the nasals are rather broadly rounded behind, occupying almost the whole upper surface, but the *processus nasales* of the frontals extend forwards on both sides with sharp points which cut deeply into the nasals between their upper horizontal and lateral vertical portions (Pl. XI, fig. 3). The premaxillaries do not reach the nasals in *C. c. arrhenii* (cf. fig. 3).

The horns of *castaneus* from Mukimbungu are much longer (about 5,5 cm.) which, of course, as being a male characteristic is of no importance for this comparison, but they are smoother all over and quite circular in section. The short (2½ cm.) horns of the female from Beni are not only transversely more rugose, but display also longitudinal ridges, so that the section is not round. The female from Beni has also the horns more raised so that they form a distinct angle with the frontal plane (Pl. XI, fig. 3), while those of the *castaneus* buck slope evenly with the frontal plane (Pl. XI, fig. 2).

The angular flange of the mandible is much more sharply set off (Pl. XI, fig. 3) in *C. c. arrhenii* than in *C. castaneus* from Lower Congo (Pl. XI, fig. 2).

The colour of the specimen from Beni is much darker than that of the *castaneus* from Mukimbungu. The general chestnut colour proves at closer inspection to be thinly

overlaid with blackish which occupies the extreme tips of many hairs. The black dorsal band is very broad, and there is a still broader ventral black band, extending from the chest between the forelegs and ending a little in front of the teats. The lower flanks on the sides of this mesial black ventral band are a little paler, and less red than the upper parts of the sides. The feet are brown rather resembling »otterbrown» (DAUTHENAY, Rép. de Coul., 354, 4), but gradually darkening to black up on the legs. This black extends on the fore-legs a good deal above the elbow, but becomes thinner on the shoulders where it finally is represented only by black tips to the rufous hairs. A strip on the inner side of the fore-legs extending down to the carpal joint has the same pale colour as the lower flanks, sharply contrasted to the blackish brown of the outer side. On the hind legs there is no such pale colour stripe, the posterior side being black (almost) to the hoofs. The front side is dark »otter brown» to the tarsal joint, gradually blending into the black, which extends well up on the hams, where it shades off with black tips to the hairs. Along the posterior side of the hams is a pronounced blackish band produced by long black tips to the hairs. The upper side of the tail is black in continuation of the black dorsal band, the underside, and partly the tip is covered with white hair.

The colour of the head is about similar to the same in *castaneus*, only a little darker.

From this description it is apparent, that the specimen from Beni also with regard to its colour differs very plainly from the typical *castaneus*.

In the year 1914 E. SCHWARZ described¹ a Duiker of this group from the Welle district. According to the short diagnose that one (named) *C. dorsalis orientalis*, is »externally not distinguishable from the other forms of *C. dorsalis*», but its skull is said to be »much larger than in any of them». The cranial measurements recorded by SCHWARZ for his *C. d. orientalis* are almost identical with those tabled above for the *castaneus* form from Mukimbungu, and with those which have been quoted for THOMAS's Congo specimen similarly named. If thus *C. d. orientalis* proves to be a valid subspecies, not only the specimen from Mukimbungu, Lower Congo, referred to above, but also THOMAS's specimens from Congo, from which he quotes the above cited cranial measurements, must be regarded as belonging to SCHWARZ's subspecies. The last author says (l. c.): »There is a gradual increase in size and facial length in the local races of *C. dorsalis* from »the West-coast forms like *C. d. dorsalis*» which »are small and have a short rostrum» — — —. »*C. d. castaneus* from South Nigeria and the Western Cameroon» should then come next, and finally »the races of the Congo forest, as typified by *orientalis*» — — —. The »*orientalis*» has, to judge from measurements recorded in the literature (some of which are quoted above), the basal length of the skull only 6,5 to 9 mm. longer than the adult *castaneus* from Cameroon,² but it appears certainly to be larger. Its distribution extends as far as is known from Lower Congo (Mukimbungu) to the Welle district (fide SCHWARZ) and Stanley Falls (fide THOMAS). In the north-eastern part of the Congo forest it is substituted by the smaller and darker form described above. The members of this group of Duikers thus decrease very decidedly again in size without reducing, however, the com-

¹ Ann. & Mag. Nat. Hist. (8), Vol. 13, 1914, p. 35.

² Cf. the measurements quoted from SJÖSTEDT above.

parative dimensions of the snout. Thus they do not approach the typical *dorsalis*, and therefore it appears better to regard them as subspecies of *castaneus*.

Cephalophus melanorheus æquatorialis MATSCHIE.

2 ♂♂, ♀♀ Beni, Aug., Sept. 1914; 2 ♂♂, 1 ♀ *ibid.*, Jan. 1914.

»Boloko» is the native name of this little Duiker according to Capt. ARRHENIUS.

One of the above noted females has no horns, but the others are provided with such. The general colour of the back is different in different individuals. In some specimens it may be said that the posterior back is somewhat »in's röthlichgelbe spielend», as MATSCHIE described¹ the type from Chagwa, Uganda. Other specimens are »warm sepia» (DAUTHENAY, 305, 4) thus resembling *C. schusteri* MATSCHIE.

Sylvicapra grimmia lutea DOLLMAN?

Capt. ARRHENIUS's collection contains only a skull of this kind. This is very much larger than the skull of the East African Duiker, *S. g. hindei* as the following measurements indicate:

Total length of skull	181,5 mm.
Basal » » »	160,5 »
Condylobasal length	172,5 »
Greatest breadth	77 »
Orbit to tip of premaxillary	97,3 »
Length of nasals	66,6 »
Least interorbital width	47,4 »
Length of palate	89,5 »
Upper molar series	55 »
Breadth across <i>m</i> ²	50 »
Breadth across outside of horn cores basally	42,6 »
Length of bulla	27 »

NEUMANN has named a subspecies from Kavirondo *Sylvicapra abyssinica nyansæ*, but he has only said that it is darker than the typical *abyssinica*, and not communicated a single skull measurement. It would thus have been impossible to make any comparison between this skull and NEUMANN's Kavirondo Duiker, if I had not had the pleasure of receiving some information about it from Professor MATSCHIE. He has kindly written that NEUMANN's Duiker is represented in the Berlin Museum by the posterior portion of the skull. The following measurements of the same, communicated by MATSCHIE, prove plainly the difference from the skull of the present collection: »Breite an den Hornzapfen 38 mm.; grösste Breite etwa 66 mm.»

From Mani, Lower Shari River, E. SCHWARZ has described² a Duiker, named by him *S. g. pallidior*. This race is said to be slightly larger than *S. g. abyssinica*, but the skull of an adult male of this race is according to the another quoted much smaller than

¹ Si z.ber. d. Ges. Naturforsch. Freunde, Berlin, 1892.

² Ann. & Mag. Nat. Hist. (8) 13, 1914, p. 36—37.

that of the present collection, viz. with a maximum length of only 168 mm., a basal length of 142 mm., orbit to muzzle 83,5 mm., length of nasals 53,3 mm. etc.

DOLLMAN's subspecies *lutea* from »N. E. Karamojo, Central Province, Uganda»¹ is described on an adult female as type. Unfortunately no adult male skull has been measured of this race, but it appears to be rather large as the greatest length of the female skull and some of its other dimensions are fully as great as, or more than those of a male *S. g. hindei*. To judge from these facts it appears probable that the skull in Capt. ARRHENIUS's collection can be referred to *S. g. lutea*.

ROOSEVELT's and HELLER's map over the »distribution of the races of bush duiker» may need some modification in consequence of this.

Hylarnus harrisoni THOMAS.

1 ♀ Beni, Aug., Sept. 1914; 1 ♀ Masisi, Febr. 1914.

The former is more vividly coloured than the latter which appears faded and apparently is in the act of shedding its old hairs. The tail is above like the back, white beneath.

The skull from Beni has a basal length of 94 mm. (the other is not quite fullgrown), distance from orbit to tip of premaxillary 47,5; length of nasals 33; greatest breadth of the same 23, length of upper molar series 31,8 mm. These measurements are somewhat smaller than those of the type, but this may be dependent on different sex, as probably the female is smaller.

Capt. ARRHENIUS has recorded in his diary that the specimen shot at Beni in the Kisuahili language was called »Songola». As this word, also spelt »Sungula», means a Hare it apparently has been used to signify the small size, and perhaps also the hornless condition of the animal.

Kobus defassa forma *dianæ* MATSCHIE.

2 male head-skins and skulls from Rutshuru, ²⁰/₆ 1914; 1 ♂, 1 ♀ complete and a male skull.

Although these specimens are from the same locality, as far as is known, they are not quite identical with regard to their colour and pattern. The two head-skins have the forehead »fawn», but the white mark above the eye is much better developed in one than in the other, and the one with smaller eye-spot has more black mixed in on the lower cheeks etc. The large white spot on the throat does not extend laterally as far as to the base of the ears. In the complete specimen the forehead is a little duller in colour, somewhat approaching »burnt umber» (Rép. de Coul., 304, 1) without, however, quite representing this colour. In this respect the specimen in question appears to resemble the specimens from Kasindi which MATSCHIE has named »*cottoni*», but it differs from those in having less white on the throat, so that this colour does not extend to the base of the ears. The colour of the body is in correspondence with MATSCHIE's descrip-

¹ Proc. Zool. Soc. London 1914, p. 318.

tion. The general colour of the female contains much more rufous brown than that of the male.

The length of the upper molar series varies between 110 and 97 mm. in the adult males; in the adult female it is 97 mm.

The tips of the horns are a little turned inwards, but in one of the bucks the right horn is as much turned outwards as the left is turned inwards, which is to be regarded as an individual anomaly.

Condylbasal length of skull	Length of horns along curve:		Length of horns in a straight line:		Tip to tip
	left	right	left	right	
413 mm.	853 mm.	830 mm.	770 mm.	763 mm.	492 mm.
382 »	790 »	778 »	695 »	698 »	512 »
404 »	841 »	848 »	720 »	760 »	522 »
397 »	845 »	828 »	770 »	745 »	628 »

When accepting and using above MATSCHIE's name *Kobus defassa diane* I only want to express that the specimens in the present collection most nearly agree with the specimens thus named by the author quoted. It does not appear probable that there really should live three different subspecies (in the usual meaning of this word) of Defassa Waterbuck not only at Lake Albert Edward, but even at one and the same place Kasindi. It is not denied by this that there are to be found certain groups, or herds of animals in each of which the individuals are alike, at the same time as they differ in one or several characters of less importance from those of another group or herd. I do not think, however, that each of these herds can be regarded as constituting a subspecies of its own, even if the sharp eye of a trained zoologist may be able to distinguish its members from the members of another herd. According to, as I suppose, the prevalent opinion among zoologists the word subspecies, as a rule, is taken as something identical with geographic race. These somewhat different Defassa Waterbucks do not represent different geographic races, but rather »family races». Such »races» are perhaps to be expected especially among polygamous animals among which even the individual characteristics of certain strong males may be inherited to a comparatively numerous offspring and transmitted through several generations. The result might be a herd, or group of animals which may be recognized on certain minor features from other individuals of the same species, but with different parentage.

As an analogy to this may be reminded about the fact that experienced stock-breeders often can distinguish cattle from different estates, although they are of quite the same race. The cause of this is evidently the same as set forth above, a certain male has put its stamp on the offspring, so that a recognizable »family race» has originated. Through inbreeding the distinguishing features may become more and more fixed. In the wild state isolation may strengthen the differences, but mixing with other animals of another herd abolish them. »Races» or groups of forms of this kind have thus not the stability which a subspecies ought to have. It is, of course, of interest to note such forms as referred to now, but, if they shall be named, it seems necessary to make a distinc-

tion between the name thus added and a real subspecific name. Such a distinction may be made by adding before the racial name a certain word like »tribus», or »forma».¹

Since the above was written I have had the opportunity of reading the observations on the variability of *Kobus defassa* made by A. DE CALONNE-BEAUFAICT² in the Welle district. The author quoted emphasizes the great variability of this Waterbuck according to age, but his statements do not contradict the opinion set forth above concerning the adult.

Adenota kob thomasi SCLATER.

Skin of a male foetus from Rutshuru, ¹⁵/₇ 1914. Three male skulls.

Redunca arundinum BODDAERT.

Two male skulls.

Redunca redunca wardi THOMAS.

A male skull and a frontlet, presumably from Rutshuru.

With regard to cranial measurements this skull is much larger than the typical *Redunca redunca*, and also larger in some dimensions than *Redunca bohor ugandæ* BLAINE.

	<i>Redunca</i> from Rutshuru	<i>R. b. ugandæ</i> fide BLAINE
Greatest length of skull	252,5 mm.	234 mm.
Basal length of skull	225,5 »	—
Occiput to tip of nasals	214,5 »	—
» » posterior end of nasals	132 »	124 »
Orbit to gnathion	140,0 »	128 »
Length of nasals	97 »	88 »
Greatest width across orbits	104 »	108 »
Least interorbital width	67 »	—
Vertical diameter of orbits	41 »	38 »
Alveolar edge of m^3 to upper brain of orbit . .	82 »	75 »
Zygomatic width	97,8 »	98 »
Length of palate	13,6 »	128 ² / ₃ »
Upper molar series	56 »	56 »
m^2	12,5 × 10,5	13 × 12

If it is difficult to determine a skull with such dimensions as those recorded above as identical with *Redunca bohor ugandæ* BLAINE, the dimensions of which are quoted

¹ The Russian ichthyologist BERG uses the word »morpha» for races of fishes, but this appears less suitable as the words genus, species etc. are latin.

² Notes sur les phases de couleur chez *Cobus defassa* et *Bos caffer* de la région de l'Uelé, Revue zool. Africaine, Vol. IV, fasc. 2—3, Bruxelles 1916.

for comparison, it is still more impossible to make such an identification with regard to the shape of the horns. BLAINE describes¹ the horns of *R. redunca ugandæ* (or as he terms it *Cervicapra bohor ugandæ*) as »short and stout, without a pronounced hook forward at ends». The horns of both specimens collected by Capt. ARRHENIUS must on the contrary be said to be very strongly hooked forwards, and with the tips much turned inwards. This is of interest because BLAINE's race *R. r. ugandæ* is typical from Nkole, Uganda, and it could therefore from a geographical point of view have been expected to find this Reedbuck at Rutshuru rather than the more eastern *R. r. wardi*.

Two young Reedbuck calves in the collection from Rutshuru ⁸/₁₂ 1913 belong without doubt to the same race.

Tragelaphus dianæ forma *sassæ* MATSCHIE.

A young ♀, Rutshuru, ⁷/₈ 1913; ♀ ad., ibid., ²⁷/₂ 1914; 2 ♂♂ ad., ibid., ²⁸/₂ 1914; a male skull without skin (cf. fig. 8).

The colour of these specimens agree on the whole with MATSCHIE's description but it is, of course, as always in Bushbucks somewhat variable. The smaller and somewhat younger, but nevertheless adult buck (with permanent dentition in place) has less white markings and no transverse stripes. In the larger 4—5 such may be traced. The same has also a white mesial stripe along the blackish chest.

	♂ ad.	♀ ad.
Greatest length of skull	261 mm.	219,5 mm.
Condylbasal length of skull	253 mm.	207 »
Basal length of skull	236,3 »	190,5 »
Distance from orbit to tip of premaxillary. . .	133 »	108 »
Greatest breadth of skull	107 »	87,5 »
Least interorbital width	61,2 »	49 »
Greatest breadth of skull in front of orbit. . .	77 »	65,5 »
Length of nasals.	89,5 »	61 »
Upper molar series	68,5 »	63,5 »
Length of horns in a straight line	363,5 »	—

The measurements of the male skull appear to be a little greater than those recorded by MATSCHIE,² but with regard to the female the opposite is the case.

Okapia johnstoni SCLATER.

A young male and a young female both with milk-dentition from Beni 1914.

The male specimen is somewhat older so that the first molars in both jaws are developed, in the female they are just cutting the gum, but m_1 is a little more developed than m^1 and its anterior lobe has already become somewhat blackened by the food.

¹ Ann. & Mag. Nat. Hist. (8), Vol. XI, 1913.

² Sitz.ber. Naturf. Fr. Berlin. 1912.

An investigation of these skins proves that the lips and the snout of the Okapi are very different from those of the Giraffe. The lips of the former are not produced as in the latter, nor does the hairy covering of the lips extend to the inner surface. The black hairs of the upper lip are directed downwards. The lower margin is fringed or



Fig. 8. A Bush-buck shot by Captain ELIAS ARRHENIUS at Rutshuru.

bordered by a narrow band of whitish hairs, and with the same ceases the hairy covering quite abruptly so that the lower resp. inner surface of the upper lip is quite naked, and laterally the inside is beset with strong conical papillae. At the end of the snout between the nostrils there is an oblong bare spot from which a vertical hair-less groove runs down

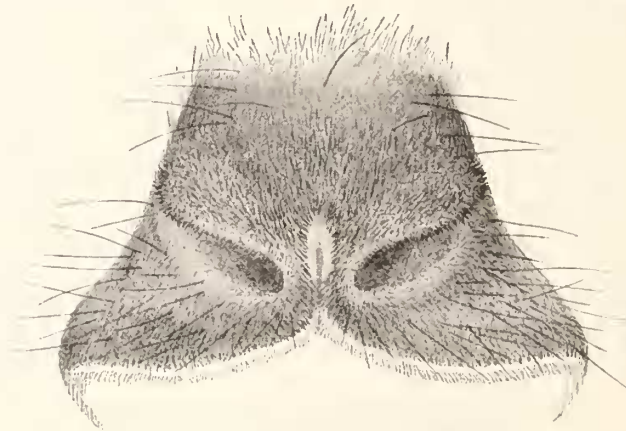


Fig. 9. Front view of snout of a young Okapi showing upper lip, nostrils and groove between the latter. (Diminished).

to the margin of the upper lip. The hairs at both sides of this groove are directed towards the same, and the fringes thus formed on both sides are continuous with the marginal whitish fringe of the lip mentioned above. The accompanying figure illustrates these arrangements and structures very plainly.

The hairs on the lower lip are in a corresponding manner directed towards its upper margin, where the hairy covering ceases just as abruptly as on the upper lip. In addition to the normal fur of these parts there are to be seen a great number of long black bristles with undoubtedly sensory function. These attain their strongest development on the chin and lower lip, but they are numerous on the upper lip as well (conf. the fig. 9).

The nostrils are partly hairy within at their borders.

With regard to colour and pattern this animal has been so fully described especially by FRAIPONT in his great monograph¹ that there is no need to comment further upon this. The dorsal mane, or crest extends in these young animals from the nape to the tail, but the hairs, of which it is composed, are considerably coarser on the fore-quarters than above the sacral region.

The structure of the upper lip and snout region of these Okapi calves, as described above, is very interesting at it illustrates in a very clear manner a stage of development which is intermediate between the more primitive condition found in the *Camelidae* with their divided upper lip on one hand, and the various stages of a more or less developed muffle which among the *Capricornia* reaches its culmen in the *Bovinae*. The mode of development is not difficult to understand. The cleft lip of the *Camelidae* represents a primitive stage, which is repeated in the ontogeny of other *Ruminantia*. In the adult stage of the latter, however, the lateral portions of the upper lip have joined mesially in front and grown together. The above described vertical groove in the upper lip of the Okapi calves represents the remnants of this seam, or line of coalescence.² The inner side of the lip is, of course, lined with a continuation of the mucous covering of the mouth cavity, while the outer surface is protected by the ordinary skin. When in the foetal stage the lateral halves of the upper lips have grown forward so as to meet each other mesially, and the conerescence begins, the line of junction may get a somewhat variable situation in relation to the different coverings of the inner and outer surfaces of the lip. If the line of junction is situated just where both tissues meet the result will be that the whole anterior surface of the upper lip is covered with skin which develops hair just as the skin elsewhere, and thus no naked rhinarium is formed as is the case in the Giraffe, Reindeer, Muskox etc. If, however, the mucous lining of the mouth has grown forward so much that the junction of the lateral halves of the lip fall inside the anterior limit of this mucous tissue, the result will be something similar to the condition described above in the Okapi calves, viz. a bare mucous strip along the line of conerescence. As has been mentioned, this bare strip derived from, and forming a remnant of the mucous lining of the mouth cavity is a little broader at its upper end, that is just in the inner angle of the cleft between the lateral portions of the lip. It appears thus as if the mucous covering of the inside had a stronger tendency to grow out just there than along the edges below. If this has happened, and, accordingly, when the cleft in the lip is closed, only a portion of mucous tissue has remained exposed at the upper end of the seam, the result will be a small naked rhinarium, isolated far from the

¹ Ann. du Musée du Congo. Zool., Ser. III, T. 1, Bruxelles 1907.

² A homologous, although somewhat different groove in the upper lip is, of course, also found among the Sheep, several Antelopes etc.

lower edge of the otherwise hairy lip, a condition which is to be found very typically in the Elk, but in various degrees also in other Ruminants. Finally, if before the closing of the cleft in the lip, the mucous tissue has grown out over the anterior edges to such a degree that a considerable portion of the same has been left outside the line of concrescence, a large bare and moist muffle is formed, as in its fullest development it is found in *Bos*, but also in many other Ruminants.

***Phacochoerus africanus centralis* n. subsp.**

The material of Warthogs in the present collection consists of and old female killed at Lake Albert Edward the 20th Dec. 1913, an old male probably from the same locality, and two boar-skulls and a skull of a sow.

The most striking feature of these Warthog skulls is their considerable size. In this respect they are not superseded by any *Phacochoerus* skull examined by the present author except by a skull of *Ph. africanus* from Cape Verd in Brit. Mus. Nat. Hist.¹ With regard to several details they display a certain individual variation which appears to be a rather common occurrence among Warthogs, but in general appearance and in relative dimensions they agree well enough as the measurements recorded below prove. Their racial identity ought accordingly not to be subjected to any doubt.

Four to six lower incisors are retained in all skulls, even in the oldest, and two upper.

	A old ² ♂	B ad. ³ ♂	C old ² ♂	D old ♀	E ad. ♀
Occiput to tip of nasals	433,5 mm.	419 mm.	417 mm.	379,5 mm.	373,3 mm.
Least width of parietal flat area	58 » (13,3 %)	58,8 » (14,2 %)	46,4 » (11,1 %)	38 »	23 »
Length of postorbital portion of skull	48,7 » (11,1 %)	56,6 » (13,5 %)	50 » (11,9 %)	49 »	39 »
Greatest breadth of skull	245 »	238 »	231 »	193,5 »	199 »
Interorbital width at middle of orbit above	142 » (32,7 %)	137 » (32,6 %)	132,3 » (31,6 %)	118,5 »	120 »
Least interorbital width	140 »	135,6 »	131 »	116,5 »	118 »
From orbit to tip of nasals	343,5 » (79,2 %)	328 » (78,2 %)	327,5 » (78,3 %)	296 »	300 »
Basal length of skull	329 »	321 »	321 »	307 »	294 »
Palatal length to end of premaxillaries	241 »	230 »	233 »	217 »	211 »

From the above measurements it may be found that the Warthog skulls of this collection nearly agree with *Ph. africanus* with regard to length. The postorbital portion of the skull is comparatively long varying from 11,1 to 14,2 % of the upper length of the skull. The breadth of the parietal flat area varies almost in a similar degree, or from 11,1 to 13,5 % of the upper length of the skull. These percentages are rather similar to

¹ Cf. LÖNNBERG, Proc. Zool. Soc. London, 1908, p. 936.

² Only last upper molar in use.

³ Two upper molars in use.

the same of *Ph. africanus* from Cape Verd (viz. 13,4 and 13,1). On the other hand the latter skull is narrower across the orbits, so that the breadth of the interorbital space is only 30 % of the upper length of the skull, while in the present specimens it measures from 31,6 to 32,7 %.

The Abyssinian *Ph. eliani* has a narrow parietal area (6—8 %) and is thus widely different.

Ph. africanus bufo HELLER from Lado is a name, which unfortunately has been established on so insufficient material as an immature skull only. It seems, however, to bear a certain likeness to the present skulls as it probably belongs to a large race, and also because it has the premaxillaries extending 57 mm. beyond the base of the tusks. Presumably this measurement has been taken not from the teeth themselves, but from the frontside of their osseous sheaths, and then this dimension is quite as large in these skulls in Capt. ARRHENIUS's collection. The value of this characteristic appears, however, debatable as the same, like many other dimensions of Warthog skulls, is very variable. To prove this may be mentioned that in a skull of an old Warthog boar shot by H. R. H. Prince WILHELM during his expedition to Brit. E. Africa this dimension is 46 mm. but in another, somewhat younger, from the same source it is 57 mm. With our present knowledge it is thus impossible to say, whether these Warthogs from the neighbourhood of Rutshuru are identical with the Lado race, or not, but it does not appear very probable.

From Ketekma, Bagirmi, E. SCHWARZ has described¹ a Warthog under the name *Ph. aethiopicus fossor*. This one as well appears to be of a large race, although the author quoted has not recorded those dimensions which are most useful for skulls of this kind² so that a comparison is made difficult. He compares, however, himself his new race with »*Ph. a. eliani*» from Massaua, and says: »occiput shorter and broader», but just by these features *Ph. africanus africanus* differs from *Ph. a. eliani*. It is thus possible that the Bagirmi Warthog is very closely allied to *Ph. a. africanus*. In which relation *Ph. a. fossor* and *Ph. a. bufo* stand to each other is for the present impossible to tell. From a geographical point of view a close relationship does not appear to be excluded.³ From the same standpoint, on the other hand, there is not much likelihood that the Bagirmi and Rutshuru Warthogs should be identical, as the whole æquatorial forest extends between their habitats, but both are undoubtedly to count among the nearest relatives of *Ph. a. africanus* and well defined from other races as *eliani* and *massaicus*. To avoid confusion it seems the best way to distinguish mostly for geographical reasons the Warthog from Rutshuru and the neighbourhood of Lake Albert Edward as *Ph. a. centralis* until further and definite knowledge may be obtained about the range of variation of the true *Ph. africanus* and *Ph. a. fossor* which as yet are imperfectly known.

As already is mentioned above, and as also is to some extent expressed by the table of measurements, the three old boar skulls now considered are somewhat different

¹ Ann. & Mag. Nat. Hist. (8), Vol. 11, 1913, p. 265.

² On the other hand he has recorded the »length of upper tooth row» which is an extremely changeable dimension within the life time of the same individual.

³ Since the above was written, I have had the pleasure of receiving a letter from Dr. SCHWARZ, in which he says: »*Phacochoerus a. fossor* ist, wie Sie selbst richtig sagen, natürlich am nächsten mit *Ph. a. africanus* verwandt und unterscheidet sich davon und von HELLER's *bufo* (das wir hier [=Frankfurt a. M.] auch haben) durch das überaus flach gestellte Jugale.»

in details. The one signed »A.» has the broadest and flattest interorbital region with only little raised orbits. »C.» again has a strongly concave forehead with much raised orbits, and »B.» is intermediate in these respects. In a similar way »A.» has the nasal region very flat, while »C.» has it strongly convex, especially in its posterior portion. »B.» is intermediate in this respect as well, but is rather flat posteriorly. As »A.» and »C.» are both very old it is impossible to explain the differences as due to age, but it must be a result of individual variation.

The female skulls are, of course, as always is the case, smaller than those of the boars, but, as the above measurements prove, they are somewhat larger than the average in *Ph. massaicus* and still much larger than in *Ph. delamerei*. Like the skulls of the boars those of the sows display a considerable variation with regard to some dimensions.

With regard to colour the Warthogs appear all of them to be pretty similar. The present specimens have the long bristles of the dorsal mane black or blackish brown at the base, but with the distal parts bleached gradually through brown to pale yellowish, about straw colour at the extreme tips. The scattered bristles on the upper side of the head and snout, in the brush above the eyes, on the outside of the ear, upper parts of the body and the shoulders are black (but may fade to brownish by bleaching as is partly the case with the sow of this collection). The whiskers are larger in the female than in the male, white in both, as are also the hairs inside the ears. The scattered bristles on the throat, lower flanks and under side are white. The tail tuft is black. The fore-feet to a patch above the callosity of the »knee» thickly beset with black hair. On the hind feet these black hairs extend on the front side about half way up the metatarsus. In the sow even these hairs are bleached to brownish.

Potamochoerus.

The material of Bushpigs in Capt. ARRHENIUS's collection consists of a about semi-adult animal (second molar developed), a quite young pig, and the skull of an adult boar. The first of these Capt. ARRHENIUS held in captivity some time at Rutshuru. As could be expected it is most nearly allied to the Uganda Bushpig, *Potamochoerus intermedius* LÖNNBERG, but differs from the same so much with regard to the general colour of the body that it most probably represents a local race which I venture to name:

Potamochoerus intermedius arrhenii n. subsp.

The snout and face is chiefly white with scattered black bristles, a black spot at the warts and a black patch at the base of the whiskers which are mixed white and black. The black band between the eyes of the typical *P. intermedius* is merely indicated by some black bristles. The whole forehead and crown are white, a little mottled by the black bases of the bristles and some few black ones. The ears are sparsely hairy on the outer side, the inner side is in its terminal portion black, but with whitish upper margin, and part of the tuft white. The dorsal mane is strongly developed, white with black bases to the very long (about 17 cm.) bristles. The sides of the back are also chiefly white mixed with

black, the dominating colour being white, produced by 9—10 cm. long hairs among which are scattered a number of 15—19 cm. long black bristle-like hairs. On the lower flanks are also to be seen some few buffish bristle-hairs which perhaps are a reminiscence of a previous more juvenile dress. The feet, legs and parts of the shoulders and hams are black. The lower side is chiefly black with some whitish bristles mixed in.

This colour pattern must be regarded as the definitive one of the adult animal as the young pigs of the genus always use to be more or less rufous. Consequently this Bushpig is very different from the true *intermedius*, which has the back and the sides pale rufous, and from the races of *chæropotamus* it differs by its white-margined and partly white-tufted ear. On the whole it may be said, that it is still more a connecting link to the *chæropotamus*-series than the typical *intermedius* itself.

The measurements of the skull of the young *Potamochoærus intermedius arrhenii* are as follows:

Occiput to tip of nasals	310 mm.
Width of parietal flat area	38 »
Greatest width at lambdoid crest	77 »
Zygomatic width	138,5 »
Width across postorbital processes	96 »
Least interorbital width	67,8 »
Orbit to anterior end of naso-premaxillary suture	164,5 »

Of these measurements the great parietal width in such a comparatively young animal is especially striking. This is the more the case because SCHOUTEDEN¹ has found the same dimension in the true *Potamochoærus intermedius* LÖNNB. to be rather narrow viz. 17 mm. even in the adult. This fact appears to prove the distinctness of *P. i. arrhenii*.

The relation of this specimen to the old boar skull is on the other hand somewhat doubtful.

The measurements of the adult *Potamochoærus* skull in Capt. ARRHENIUS's collection are as follows:

Upper mesial length from occipital crest to tip of nasals	383 mm.
Least width of parietal flat area	41 »
Greatest width of lambdoid crest	92,5 »
From tip of postorbital process to lambdoid crest	97,8 »
Zygomatic width	181 »
Width across postorbital processes	103 »
Least interorbital width	75 »
Orbit to front end of naso-premaxillary suture	220 »
Hind surface of m^3 to tip of premaxillary	236 »
Length of m^3	35,5 »
Greatest width of m^3	23,6 »

The dimensions recorded above indicate evidently a very large animal with a comparatively broad parietal region. In both these respects it resembles *P. chæropotamus*

¹ Revue Zool. Africaine, Vol. II, p. 140.



Fig. 10. A young *Potamochoerus* pig from Masisi showing the striped pattern.

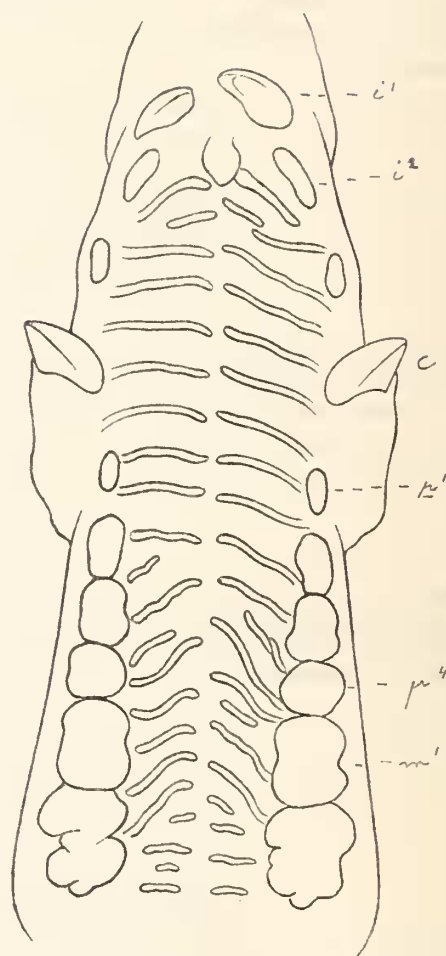


Fig. 11. Palatal aspect of *Potamochoerus intermedius arrhenii*.

johnstoni MAJOR without that I think that it is identical with the race mentioned, which is perhaps still larger. Nevertheless, the present skull displays with its great breadth of the parietal area more resemblance to *P. ch. johnstoni* than to the true *P. intermedius*, to judge from the measurements of a skull of the latter communicated by SCHOUTEDEN.¹ The author quoted has as already has been mentioned recorded the breadth of parietal area in an adult *P. intermedius* to be only 17,5 mm., while the same dimension according to my own observations² on an adult and a semiadult *P. ch. johnstoni* (in Brit. Mus. Nat. Hist.) is resp. 44 and 41 mm.

For the present and until more material is available it appears best to leave the question about the identity of this skull open. It may, however, be mentioned that SCHOUTEDEN has referred a couple of Bushpigs from Kitalanga in the Katanga province to *P. ch. johnstoni* on account of their broad parietal region.

It might also be possible, that this big boar skull should belong to the race which just has been named *P. i. arrhenii*. For such a theory speaks the fact that both have a broad parietal area. The great difference otherwise in size should then be explained as due to differences in age and sex.

The small *Potamochoærus*-pig is collected at Masisi, three days west of Kivu the 4th of Febr. 1914. As it is from another locality it is not certain to which race of Bush-pig it may belong. It might even belong to some race of the *porcus*-series, because the ears have light margins, but as such partly are found also in *P. intermedius* and *P. i. arrhenii* it might be of the latter race. It has a very fine pattern of longitudinal stripes on the back (fig. 10). The general colour might be described as something between »rust red» (DAUTHENAY, 318, 1) and »Mars yellow» (l.c. 316, 4). In this colour three broad longitudinal black bands extend along the back from above the shoulders. At a closer inspection, however, it is found that each of these three broad black bands is divided by a narrow and sometimes faintly developed rufous stripe. The stripe which cuts the mesial black band corresponds evidently to the future dorsal crest, but it is only faintly developed at this age. Laterally from the three broad black bands one or two narrower black bands may be traced, but they are by far not so conspicuous and chiefly only on the hind quarters.

The head is dark, the forehead and crown being grizzled black and rufous. The surroundings around the eyes are rust red with a narrow black eye-brow stripe and a small whitish spot underneath the eye. The ears are black with yellowish margins on both sides. The snout is dark brown; the chin is black, and the throat is mixed rufous and white with a small central black spot. A white band along the lower cheeks corresponds to the future whiskers. The chest is white and in the middle the belly has the same colour, but laterally it is »Mars yellow» (316, 1). The fore-feet are brownish, the hind feet somewhat mixed with whitish, but mostly greyish brown. The tuft of the tail is partly yellow, partly black.

The dentition of this animal is very interesting. In the upper jaw the two median pairs of incisors have not yet cut the gum, but *id*₃ is long, slender and canine-like,

¹ Revue Zool. Africaine, Vol. II, p. 140.

² Ark. f. Zoologi, Bd. 7, n:o 6, p. 17.

similar to *cd*. In the lower jaw the median pair of incisors, are distinctly bilobed, any second pair is not visible, but *id*₃ are long and slender, although somewhat shorter than *dc*. The four pairs of milk molars in both jaws are in the act of cutting the gum, but the foremost pair is very small, in the upper jaw quite rudimentary.

Palatal folds of *Potamochærus*:

As the skull of the young *P. intermedius arrhenii* had been dried with some of the soft parts adherent, and the soft palatal parts were preserved in such a state that the arrangement of the palatal folds could be very plainly seen, I have let prepare the accompanying sketch of the same (fig. 11). The palatal folds of the domestic Pig have been well described and beautifully figured by G. RETZIUS,¹ and the present author has given a short note about the same of a young pig of *Phacochærus*.² In both the animals mentioned the number of folds, or pairs of folds, is about 23. In this *Potamochærus* there are 22 folds on each side, but due to some irregularity the real pairs can only be regarded to be 20 in number. In the domestic Pig all folds are nearly transverse, although the 6 posterior ones behind the level of *p*⁴ are lower and more irregular. In the Warthog the anterior folds are eurved forward, the middle ones obliquely arranged, and the three last only formed by a series of papillæ. In *Potamochærus* as in the Warthog three different sets can be discerned. The 10 anterior pairs (instead of 17 in the domestic Pig) are (almost) transverse (except the foremost which are oblique), and this condition prevails about to the level of *p*². Then follows about 7 pairs which are obliquely arranged with the lateral ends behind the level of the mesial ends. The three hindmost pairs again are transverse but short. On the whole this arrangement is thus more similar to that of *Phacochærus* than to that of *Sus*.

Manis tetradactyla LIN.

1 specimen from Beni, Jan. 1914.

Manis tricuspis RAFINESQUE.

A mutilated native skin with no locality.

¹ Biolog. Untersuch., N. F. XIII, Stockholm 1906, p. 133 & 134, Taf. XXXVII, fig. 3—5.

² K. Vet. Akad. Handl., Bd. 49, Stockholm 1912. N:o 7, p. 23.

Explanation of plates.¹

- Pl. I. Fig. 1. Adult male of *Gorilla beringei mikenensis* n. subsp. (n:o 164) shot by Capt. ELIAS ARRHENIUS on the volcano Mikeno, Virunga mountains, ¹⁴/₅ 1914.
Fig. 2. Immature male and female Gorillas of the same race (n:o 39 & 40) from the same locality, ²⁷/₁₂ 1913.
- Pl. II. Fig. 1. Front view of the skull of old male *Gorilla beringei mikenensis* n. subsp. (n:o 164), diminished.
Fig. 2. Palatal view of the same, diminished.
- Pl. III. Fig. 1. Profile view of the skull of old male *Gorilla beringei mikenensis* n. subsp. (n:o 164), diminished.
Fig. 2. Profile view of the skull of semiadult male *Gorilla beringei mikenensis* n. subsp. (n:o 165), more diminished than fig. 1.
- Pl. IV. Fig. 1. Front view of the skull of semiadult male *Gorilla beringei mikenensis* n. subsp. (n:o 165), diminished.
Fig. 2. Profile view of the skull of young male Gorilla of the same species, with milk-dentition and first molars (n:o 166), diminished.
Fig. 3. Front view of the same as fig. 2, diminished.
Fig. 4. Palatal view of the same, diminished.
- Pl. V. Fig. 1. Front view of skull of old male *Anthropopithecus cf. cottoni* MATSCHIE (n:o 70) from Rutshuru, ⁸/₂ 1914, diminished.
Fig. 2. Profile view of the same.
Fig. 3. Front view of a female Chimpanzee skull (n:o 161) of the same race and from the same locality, with small orbits, diminished.
Fig. 4. Front view of a female Chimpanzee skull (n:o 160) of the same race and from the same locality, with large orbits.
- Pl. VI. Fig. 1. Palatal view of the skull of old male *Anthropopithecus cf. cottoni* MATSCHIE (n:o 70) from Rutshuru, diminished.
Fig. 2. Lower jaw of female n:o 178 of the same race of Chimpanzee from the same locality, to show supernumerary molars on both side, diminished.
Fig. 3. Lower jaw of female n:o 160 of the same race of Chimpanzee from the same locality, to show supernumerary molar on left side, diminished.
Fig. 4 a. Right molar series of lower jaw of female Chimpanzee n:o 224;
b. Left molar series of lower jaw of female Chimpanzee n:o 181.
These two figures have been photographed at the same time and on the same plate to prove the great variation in the size of the teeth.
Fig. 5. Profile view of skull of *Colobus ellioti* DOLLMAN, ♂ from Beni (n:o 203).
- Pl. VII. Fig. 1. Skull of young male of *Papio tessellatus* ELLIOT from Rutshuru, with only milk-dentition. ²/₁ nat. size.
Fig. 2. Skull of young male of the same species, with first molars developed. ³/₁ nat. size.
Fig. 3. Skull of semiadult male of the same species, last molar not yet visible. ⁷/₁₀ nat. size.
Fig. 4. Skull of adult male of the same species. ⁷/₁₀ nat. size.
Fig. 5. Skull of adult female of the same species. ⁷/₁₀ nat. size.
- Pl. VIII. Fig. 1 a (n:o 23) and b (n:o 25). Profile views of skulls of two male specimens of *Cercopithecus schmidtii enkamer* MATSCHIE shot the same day, ¹⁶/₉ 1913, at Rutshuru by Captain ELIAS ARRHENIUS. Both photographed on the same plate at the same exposure.
Fig. 2 a (n:o 23) and b (n:o 25). Front views of the same skulls as the foregoing. Both photographed on the same plate at the same exposure.
Fig. 3. a (n:o 19) and b (n:o 24). Profile views of two female skulls of *Cercopithecus schmidtii enkamer* MATSCHIE from Rutshuru. Both photographed on the same plate at the same exposure.

¹ The exact measurements of the figured skulls etc are to be found in the text.

- Fig. 4 *a* (n:o 19) and *b* (n:o 24). Front views of the same skulls as the foregoing. Both photographed on the same plate at the same exposure.
- Fig. 5 *a* (n:o 19) and *b* (n:o 24). Palatal views of the same specimens as above.
- Pl. IX. Fig. 1. Foetus of *Elephas africanus cottoni* LYDEKKER.
- Pl. X. Fig. 1. Profile view of a female skull of *Cephalophus weynsi* THOMAS from Beni
 Fig. 2. Profile view of the female type skull of *Cephalophus weynsi rutshuricus* n. subsp. from Rutshuru.
 Fig. 3. Profile view of the female type skull of *Cephalus claudi mixtus* n. subsp. from Beni.
- Pl. XI. Fig. 1. Profile view of a female skull of *Cephalus leucogaster* GRAY from Beni.
 Fig. 2. Profile view of a skull of *Cephalophus castaneus* THOMAS from Mukimbungu, Lower Congo.
 Fig. 3. Profile view of the female type skull of *Cephalophus castaneus arrhenii* n. subsp. from Beni.
- Pl. XII. Fig. 1. Profile view of a male skull of *Cercocebus albigena ituricus* MATSCHIE from Beni.
 Fig. 2. Frontal view of the same skull.
 Fig. 3. Palatal view of a male skull of *Damaliscus korrigum ugandæ* BLAINE to show the shape of the choanæ and the first premolar.

Tryckt den 1 september 1917.



Fig. 1.



Fig. 2.

Cederquists Graf. A. B., Sthm.



Fig. 1.

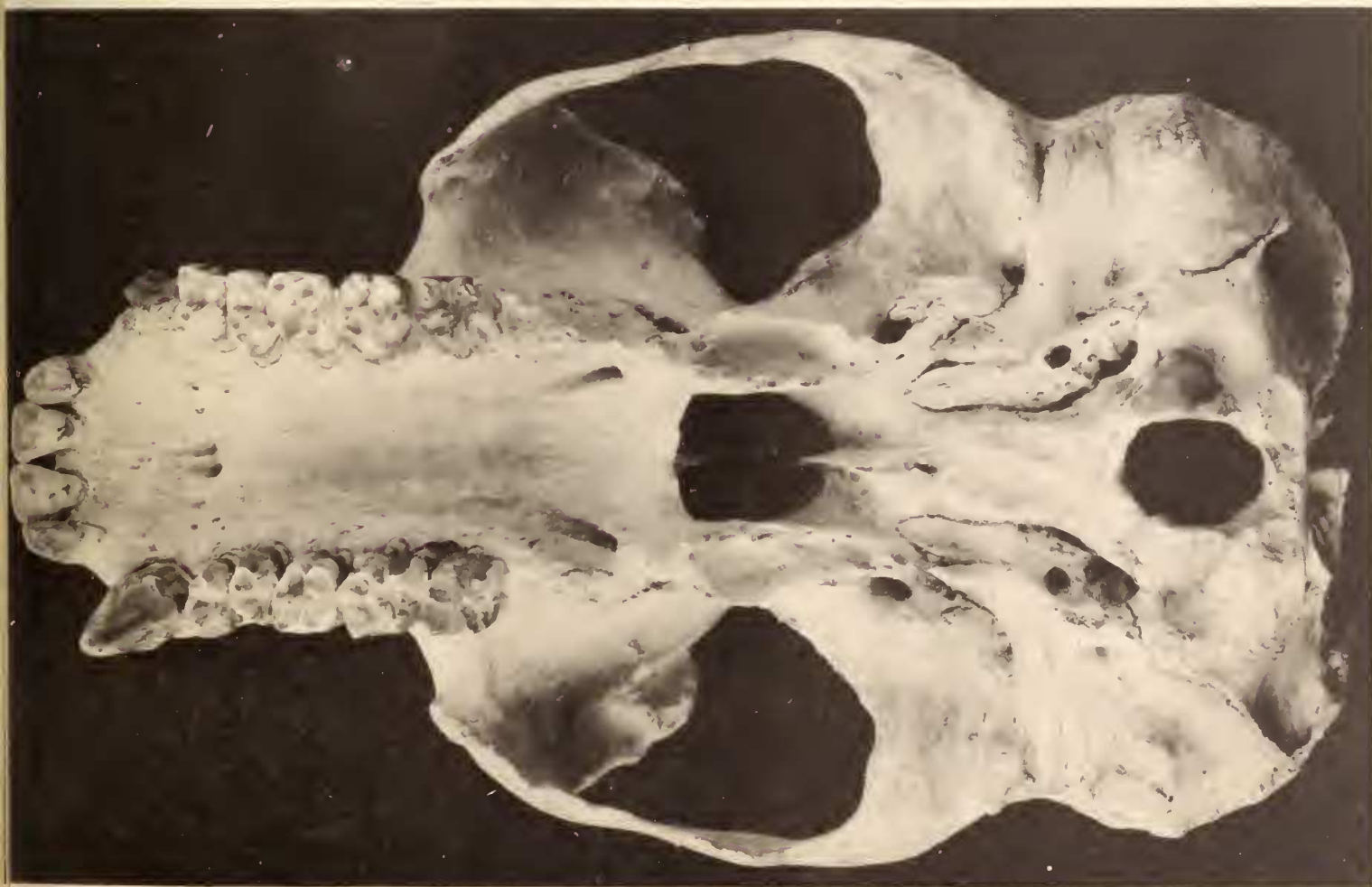


Fig. 2.



Fig. 1.



Fig. 2.



Fig. 1.



Fig. 4.



Fig. 2.



Fig. 3.

Cederquists Graf. A.-B., Sthlm.



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

Cederquists Graf. A.-B., Sthlm.

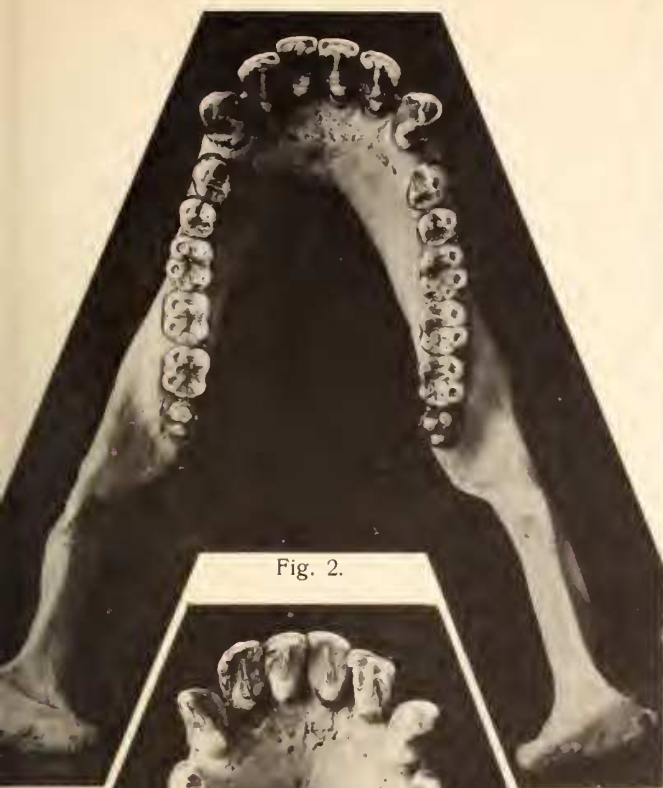


Fig. 2.

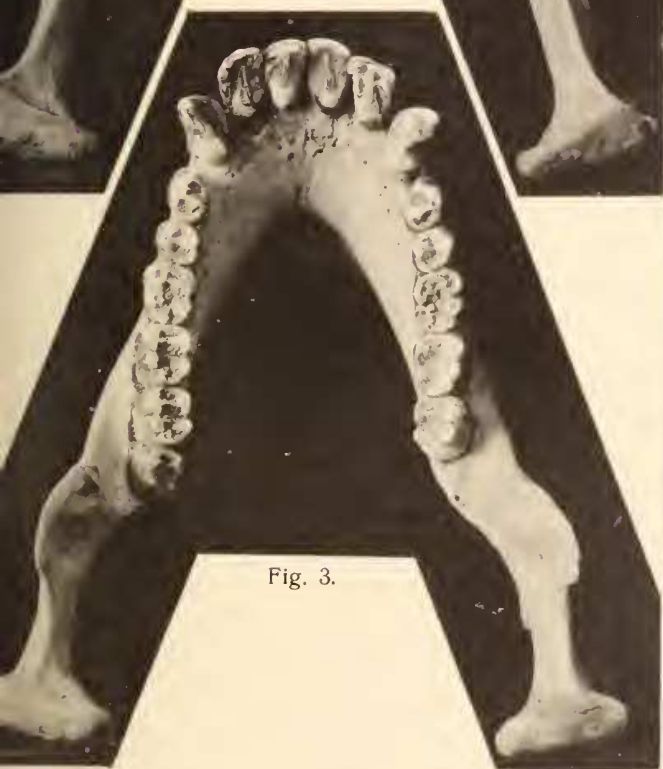


Fig. 3.



a



b

Fig. 4.



Fig. 1.



Fig. 5.



Fig. 1.



Fig. 3.



Fig. 2.



Fig. 4.



Fig. 5.



a



b

Fig. 1.



a



b

Fig. 2.



Fig. 3.

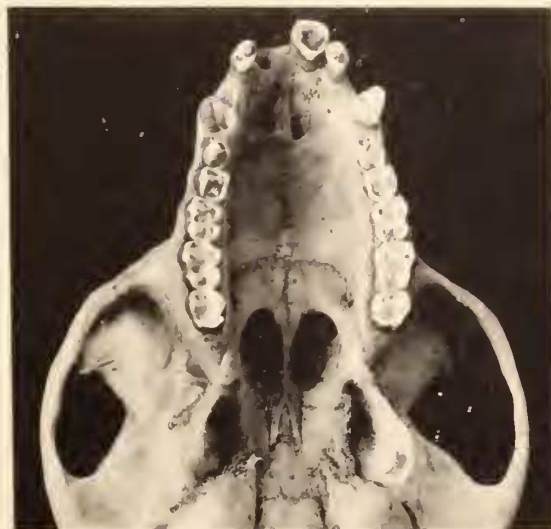


a



b

Fig. 4.



a



b

Fig. 5.





Fig. 1.



Fig. 2.



Fig. 3.



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 1.



Fig. 2.



Fig. 3.